OFFICE OF THE
Auditor General
of British Columbia

BACKGROUNDER **OCTOBER 6, 2004**

DIABETES

What is diabetes?

Diabetes is the name given to conditions in which the amount of glucose (a form of sugar) in an individual's blood is raised above normal levels.

What are Type I and Type II diabetes?

Type I diabetes (previously referred to as juvenile-onset diabetes) occurs when the pancreas does not make the insulin necessary for metabolizing the sugar in the blood. This type of diabetes usually shows itself when a person is a child, adolescent or young adult. It requires daily injections of insulin to maintain a safe blood sugar level. It accounts for about 10 – 15 per cent of the cases of diabetes in B.C.

Type II diabetes occurs when, for a variety of reasons, the body's insulin does not effectively process the glucose in the blood. It most often occurs after a person reaches the age of 30, and becomes increasingly common with increasing age. It most often occurs in those who are overweight or obese. Sometimes it can be managed with exercise and diet; sometimes it requires insulin or other medications. It accounts for about 85 per cent of the cases of diabetes.

How many people in B.C. have diabetes?

About 5.1 per cent of the population now has been diagnosed with diabetes, with this number expected to rise to 7.1 per cent by 2010.

What are the most common complications of diabetes?

Diabetes will often reduce an individual's life expectancy –on average, people with diabetes have about twice the mortality rate of their fellow citizens of the same age. Diabetes is a leading contributor to death from cardiovascular disease, to kidney failure, to amputations and to blindness. For example, Canadians with diabetes suffer, and die, from cardiovascular illnesses two to four times more often than their fellow citizens. They are also over 17 times more likely to suffer lower limb amputation than people their age who do not have diabetes.

What are the costs of diabetes in B.C.?

The cost to the public health care system of providing health care to people with diabetes is estimated at more than $750 million annually. A significant portion of that cost relates to the disease itself, as the cost of health care for British Columbians with diabetes is about 1.7 times greater than that for their fellow citizens. As well, many individuals who have diabetes find they have to pay for a portion of the costs of necessary medication and equipment.

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Preventing and Managing Diabetes in British Columbia

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The Honourable Claude Richmond
Speaker of the Legislative Assembly
Province of British Columbia
Parliament Buildings
Victoria, British Columbia
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Dear Sir:

I have the honour to transmit herewith to the Legislative Assembly of British Columbia my 2004/2005 Report 3: Preventing and Managing Diabetes in British Columbia.

Wayne Strelioff

Wayne Strelioff, FCA
Auditor General

Victoria, British Columbia
October 2004

copy: Mr. E. George MacMinn, Q.C.
Clerk of the Legislative Assembly

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Auditor General's Comments

Wayne Strelioff, FCA
Auditor General

Throughout the world we are seeing large increases in diabetes—and British Columbia is no exception. About 5.1% (expected to rise to 7.1% by 2010) of all British Columbians have diagnosed diabetes, and an unknown number have diabetes but have not yet been diagnosed.

To put this in context: one in 20 British Columbians now suffers from a disease that:

- results in a mortality rate about twice that of their fellow citizens of the same age,
- increases the risk of dying from heart disease by two to four times,
- is the main cause of kidney failure in Canada, and
- greatly increases the chance of becoming blind or having a foot or leg amputated.

And, the British Columbia health care system is now spending over $760 million a year on hospital, pharmaceutical and medical services for people with diabetes.

Because providing services to people with chronic illnesses like diabetes is such a major cost driver for health care, we carried out an audit to assess whether British Columbians are receiving value for money from our health care system's efforts to prevent and manage diabetes.

We concluded that current British Columbia efforts to prevent and manage diabetes are praiseworthy, but inadequate to address the problem

In our audit we looked for a coordinated suite of best practices, intervening at *all three stages* in the life cycle of the illness:

Primary prevention aims to keep healthy people from starting down the road to diabetes.

We found laudable primary prevention efforts by health authorities and other bodies, such as cities and school districts, often as pilot projects. However, such local agencies have limited access to the possible levers of change needed for successful prevention. The provincial government controls many of these levers, such as taxation and school curricula, but is not using them.

Auditor General's Comments

Secondary prevention detects people whose blood sugar is approaching diabetic levels and arrests their condition before it becomes full-blown diabetes.

Research elsewhere shows the value of secondary prevention. Despite this, we found no organized secondary prevention program in British Columbia.

Disease management provides people who have diagnosed diabetes with care and treatment to prevent, or at least minimize, the health-threatening complications of the disease.

We found that British Columbia puts out substantial effort at this stage, as shown by the amount it spends annually on diabetes care. Better organization of this care could lead to substantial gains in effectiveness, and a number of pilot projects are testing ways to make these gains. Nevertheless, we found weaknesses in translating the results of these pilots into an improved system of care.

The provincial government has made it clear that prevention and management of diabetes is a priority goal: "we must…[b]etter serve the needs of people who are chronically ill…[p]ut a greater focus on health promotion and comprehensive approaches to preventing disease, rather than simply intervening once patients become ill….this means doing more to…prevent and control diabetes…."[1] Our findings show that there is a large gap between goals and actions. Right now, we can only echo the comment of a U.S. health expert, looking at his own nation's efforts to manage chronic illness: "You can't get there from here."[2]

In short:

1. Diabetes is a serious and growing problem in B.C.
2. Current actions to prevent and manage diabetes may be efficient, but they are not *sufficient* to deal with the problem.
3. Closing the gap between problem and actions will call for different organization and resources and, most likely, significantly more of both—moving the problem beyond the administrative sphere to the legislative sphere.

[1] *The Picture of Health: How We Are Modernizing British Columbia's Health Care System*, B.C. Ministry of Health Planning, Victoria, B.C., December 2002.

[2] "You Can't Get There From Here: Obstacles to Improving Care of the Chronically Ill," Bruce C. Vladeck, *Health Affairs*, November/December 2001, p. 175.

Auditor General's Comments

A note about the audit

Our audit criteria—our expectations—were that services and actions would be appropriately targeted, timely, effective, efficient, delivered in a way that is sustainable, and continuously improving. In particular, we expected that:

- People at risk of developing diabetes would be made aware of the risk factors, and provided with opportunities to adopt lifestyle changes that can prevent or delay diabetes onset.
- People with diabetes would receive the health services and education necessary to see that their condition is diagnosed and managed effectively.
- The Legislative Assembly and citizens of British Columbia would be informed about the health ministry's and health authorities' performance in preventing and managing diabetes.

We focused on the roles played by the Ministry of Health Services and by the health authorities (Vancouver Island, Vancouver Coastal, Northern, Interior and Fraser Health Authorities, and the Provincial Health Services Authority). We expected those roles to include not only direct action, but also the encouragement and influence of other players (such as other ministries, municipalities, and private physicians) to act in ways that aid diabetes prevention and management.

Diabetes is the name applied to a group of chronic disorders, the underlying causes of which result in raised blood sugar levels. What is called type 2 diabetes accounts for most cases. Type 1, which is usually first diagnosed in children or young adults, and needs regular injections of insulin, accounts for 10–15% of cases. Our main focus was on type 2 diabetes, because it affects the largest number of British Columbians. Also, many services benefit people with all types of the disease. However, we looked for situations where management of type 2 and other types of diabetes differed.

The information used to prepare this report was gathered between February 2003 and January 2004. Our examination was carried out in accordance with assurance standards recommended by the Canadian Institute of Chartered Accountants and, accordingly, included such tests and other procedures as we considered necessary in the circumstances.

Our recommendations in this audit highlight the key steps needed for systemic change

Usually, what to address in recommendations, and who to address them to, are relatively straightforward. Not so in the present audit. Should recommendations be addressed to the provincial government and the health authorities, since all have important roles in the delivery of diabetes prevention? We certainly expect government to make good use of the skills and knowledge residing in the health authorities. However, we are directing our recommendations to the provincial government, because of its lead role in directing and funding health authorities and because most tools for primary prevention rest in its hands.

Further, we address our recommendations to the provincial government as a whole, not just the Ministry of Health Services, because most primary prevention tools are held by other ministries —such as Finance, Transportation, and Education.

Given the large gap between government's general policy goal and the programs in place, we did not think it useful to make detailed recommendations. Instead, we recommend an organized process for choosing the best mix of program efforts to fill that gap.

The first step in that process would be to search out potentially effective and research-supported methods of prevention and management, and then—through pilot projects or other means—determine the effectiveness of these methods when applied in British Columbia.

The second step would be to develop a well-supported set of implementation strategies that explain in detail the costs and benefits (in medical, social and financial terms) of applying the recommended methods of prevention, and of not doing so. This step is very important. Research has shown many diabetes prevention actions to be *effective*—the standard applied to most health care. Only some are also *cost-effective*—that is, producing "units of health," such as additional years of life, at less than a predetermined cost per unit. And even fewer are *cost-saving*—delivering more "units of health" per dollar than the treatment currently used.

In other words, in the short term at least it is likely that spending will have to increase if diabetes prevention is to be successful. Indeed, indications are that the disease will continue to increase in prevalence unless significant government interventions occur.

In reality, the choice is how to intervene in a way that balances the interests of the present and the future. Today, we enjoy the benefits of societal choices (such as cheap and convenient automobile travel and calorie-rich food) that will lead to increasing diabetes in the future. Well-designed and delivered efforts (and thus spending) now will mean a healthier, more productive population (and lower health care costs) in the future. Minimizing effort now leaves future generations with a health deficit, and the financial consequences of that.

What this all means is that the key decisions required would not be administrative, but about the allocation of public funds and about intergenerational equity: both clearly policy decisions. Therefore, at this stage the strategies would need to be submitted to Cabinet. Our recommendations explicitly recognize that tough choices will have to be made—choices that are rightly the prerogative of our elected representatives.

After those choices are made, the final step would be to implement the methods of prevention chosen by Cabinet—effectively, and sustained over the years, even decades, needed to make a difference. The work done over the last fifty years to reduce tobacco smoking—a health problem with many analogies to diabetes—gives us a good sense of how much effort will be needed, and for how a long a time.

We recommend that the provincial government engage in an organized process to:

1. **Search out potentially effective and research-supported methods of preventing diabetes and its consequences, and determine through pilot projects or other means the effectiveness of these methods when applied in British Columbia.**
2. **Develop, and provide to Cabinet, well-supported strategies for prevention, including documentation of the costs and benefits (in medical, social and financial terms) of applying the recommended methods of prevention, and of not doing so.**
3. **Implement the strategies chosen by Cabinet in such a way that they can achieve their optimum effectiveness and be sustained long enough to be effective.**

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Detailed Report

Diabetes is a Growing Problem

Diabetes mellitus (referred to commonly as diabetes) is a group of life-long disorders with many underlying causes, all of which are manifested in raised blood glucose (blood sugar) levels. There are two major kinds of diabetes: type 1 and type 2.

Type 1 diabetes is an autoimmune disease in which the body produces little or no insulin, a hormone needed to convert food into energy. To survive, people with type 1 diabetes must regularly inject themselves with insulin. Most often first diagnosed in children or young adults, this form of diabetes accounts for about 10% of all cases. Type 1 diabetes itself is not as yet preventable, although many of its complications can be prevented by careful management.

Type 2 diabetes, which results when the body does not produce enough insulin or does not use it effectively, accounts for most cases of diabetes. It usually begins in people older than 30 and becomes more common with advancing age. However, it can also occur in children or adolescents and, in a worrying trend, is beginning to do so more frequently. Type 2 diabetes and its complications are to a large extent preventable.

The first symptoms of diabetes are related to high blood sugar levels. As these levels rise, glucose passes into the urine. The kidneys excrete additional water to dilute the large amounts of glucose being lost. This leads to excessive urination which in turn creates abnormal thirst. In type 1 diabetes, symptoms usually develop rapidly. The onset of type 2 diabetes is typically more gradual, with noticeable symptoms often taking many years to manifest.

Over time, elevated blood sugar levels damage blood vessels, nerves and other tissues. This can result in serious long-term complications such as heart attack, stroke, vision loss or kidney failure.

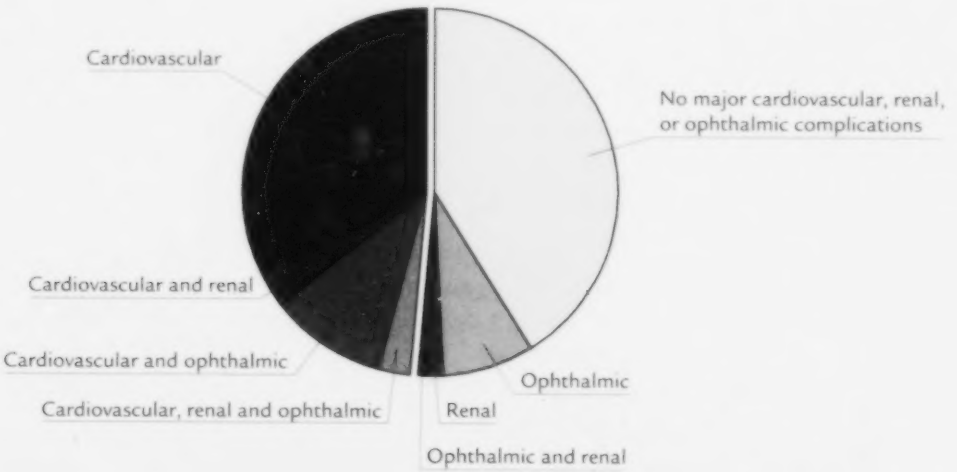
Diabetes has unpleasant and costly consequences

British Columbians with diabetes have about twice the mortality rate of their fellow citizens of the same age. One of the main causes of this shortened life is cardiovascular disease (see Exhibit 1). Approximately 80% of people with diabetes will die of it. Canadians with diabetes suffer, and die, from cardiovascular illnesses two to four times more often than their fellow citizens. In Great Britain, mortality rates from coronary heart disease are up to five times higher in people with diabetes.

Diabetes-caused damage to small blood vessels is the number one cause of kidney failure in Canada and the Western world. In British Columbia, 39% of patients receiving kidney dialysis in 2000/2001 had diabetes.

Exhibit 1

In Saskatchewan, almost half of adults with diabetes also have a cardiovascular disease complication



Source: "The Cost of Major Comorbidity in People with Diabetes Mellitus," Scot H. Simpson et al, *Canadian Medical Association Journal*, 24 June 2003

Diabetes-caused damage to small blood vessels can also lead to other serious complications. These include eye damage (sometimes serious enough to cause blindness) and ulcers and infections in feet or legs so serious that amputation is required. In Great Britain, diabetes is the leading cause of blindness in people of working age. In Canada, people with diabetes are over 17 times more likely to suffer lower limb amputation than people their age who do not have diabetes.

Not surprisingly, the health consequences of diabetes have financial consequences—in costs to the health care system, in out-of-pocket costs for people with diabetes, and in total impact on the economy. British Columbia spends over $760 million a year on publicly funded hospital, pharmaceutical and medical services to people with diabetes—about one-sixth of total expenditures on such services. The estimated cost of providing these services to people with diabetes is about 1.7 times greater than the cost of serving otherwise similar people who do not have diabetes.

People with diabetes also incur extra out-of-pocket costs because of their illness. A British study concluded that people with diabetes in the U.K. incurred direct personal costs of the equivalent of over $2,000 per year, not including lost earnings. For those people with diabetes-related complications, direct personal costs were three times that.

The total economic burden of diabetes and its chronic complications for all of Canada has been estimated at over $7 billion (for 1998). Cardiovascular disease was the major reason for these costs. Studies in the United States show this to be the case there too. For example, one large health plan found that people with diabetes but not cardiovascular disease had annual costs almost twice those of people who had neither condition. People with both conditions had annual costs about four times higher than those with neither.

Diabetes is a growing problem worldwide

The prevalence of type 2 diabetes is on the rise around the world. British Columbia is no exception. About 5.1% of all British Columbians have been diagnosed with diabetes. As well, there are an unknown percentage of people who have diabetes that has not yet been diagnosed. Studies elsewhere in Canada, and in the United States, have estimated that 2% or more of adults in each country have undiagnosed diabetes.

The prevalence of diabetes in British Columbia—that is, the percentage of British Columbians with diagnosed diabetes—has been growing recently, and the Ministry of Health Services expects it to reach 7.1% by 2010. This is a conservative estimate, based on mortality and incidence rates in the recent past. ("Prevalence" is the number or ratio of people who have a diagnosed disease at a point in time; "incidence" is the number or ratio who are diagnosed with the disease in a given year. Prevalence increases if the incidence of new cases exceeds the number of people with the disease who are cured, die or leave the province.) Disease patterns in other jurisdictions indicate disquieting hints that the prevalence of diabetes in British Columbia may increase more than the projection.

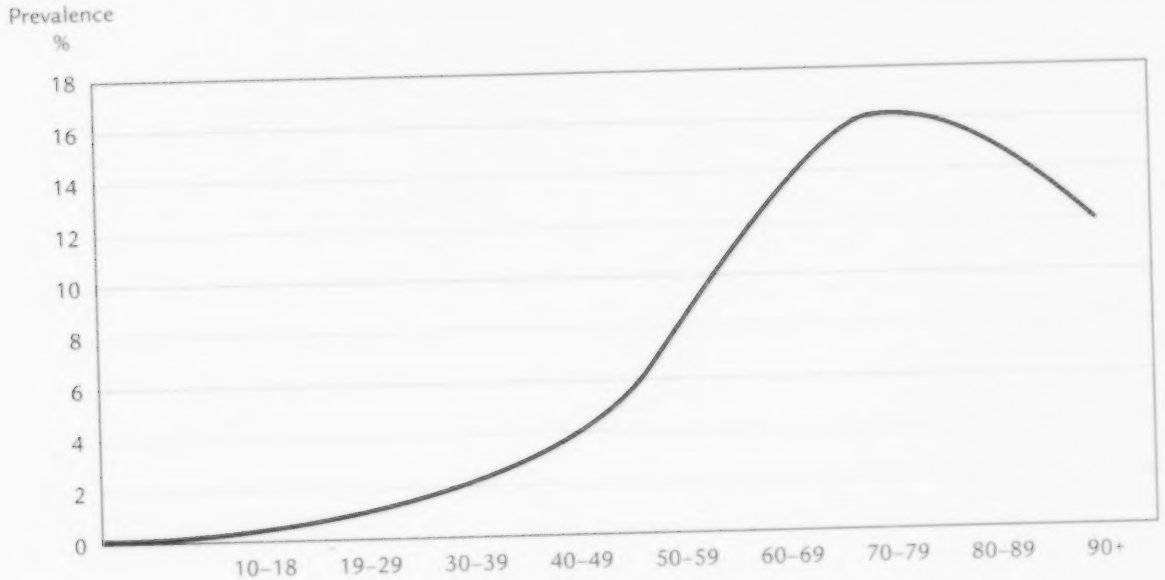
There are several reasons why the prevalence of diabetes is increasing. One is that people with diabetes are surviving longer, thanks to modern health care. Another reason is simply that ours is an increasingly older population on average, and diabetes is more common with increasing age (see Exhibit 2).

British Columbia's changing ethnic mix can also affect the prevalence of diabetes. Members of visible minorities and First Nations people have a higher prevalence of type 2 diabetes than do other people. (The relative contribution of genetic and other factors is not clear.) At present, about a quarter of British Columbians are either members of a visible minority or have First Nations origins.

Exhibit 2

Prevalence of diabetes increases with age

Age-specific rates, BC 2000/01



Source: *A Snapshot of Diabetes Care in British Columbia 2000/2001*, British Columbia Ministry of Health Services, 2002

First Nations people and diabetes

Type 2 diabetes is a major health problem for First Nations people throughout North America. Research in Alberta indicates that the age-standardized prevalence of diabetes is 8.5% among the First Nations population there—more than twice that for the general population. Some estimates are that, in Canada as a whole, First Nations people have three to five times the risk of diabetes of the general population. Rates are even higher in particular First Nations groups. Among the Pima in Arizona, for example, almost half the adults 30–64 years of age have diabetes.

An especially worrisome trend is the increase in type 2 diabetes in children of First Nations origin. This disease was formerly extremely rare in all children, but prevalence rates of the disease in Canadian First Nations children (5–18 years) have recently been found to be as high as 1 in 100.

Information is limited about diabetes prevalence among First Nations people in British Columbia. In a First Nations health survey carried out in the province in 2000, 5.5% of respondents reported they had diabetes. Anecdotal reports suggest that rates could be significantly higher in some parts of the province.

This prevalence appears to be the result of a combination of genetic, cultural, and socio-economic factors. Effective prevention and management are difficult for several reasons, including the following:

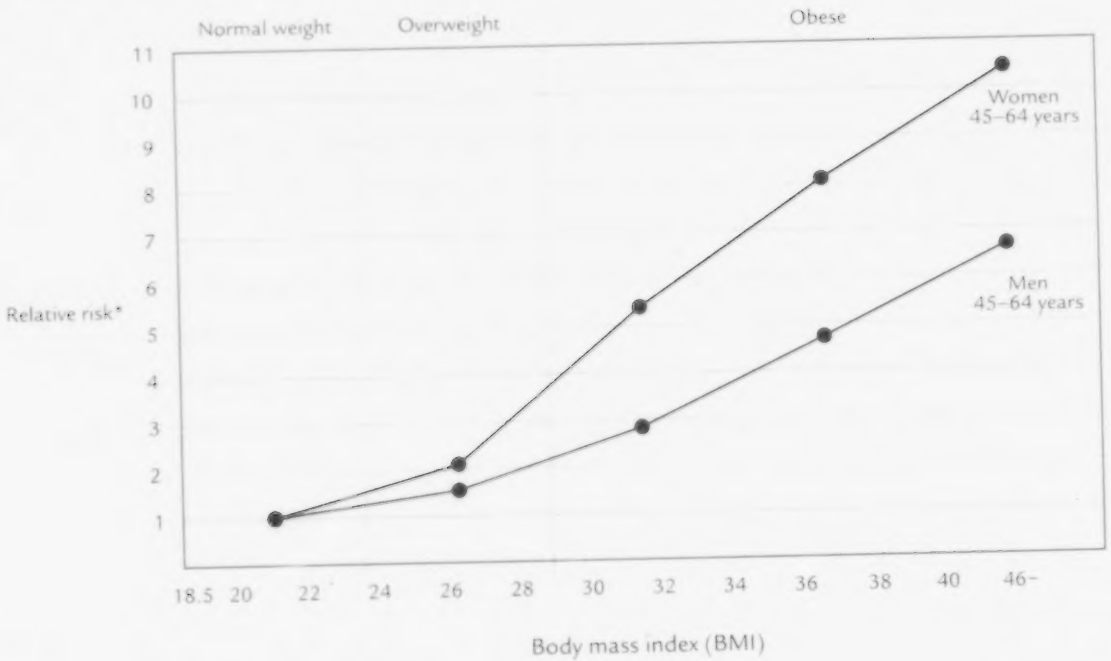
- Responsibility for health care of First Nations people is divided, in complex (and confusing) ways, among the federal and provincial governments and, in some cases, First Nations governments.
- Many First Nations people live in small, isolated rural communities, and share with their non-aboriginal neighbours such difficulties as lack of local services and long distances (and high costs) to travel to urban health facilities.
- Cultural barriers (including lack of English fluency, different beliefs about sickness and death, and real or perceived prejudice) keep many First Nations people from making full use of health care services such as family physicians, hospitals, and diabetes education centres.

However, perhaps the most worrisome influence on the prevalence of type 2 diabetes is weight gain, resulting from over-consumption of calorie-rich food or lack of physical activity. Being above a healthy weight puts a person at significant risk for diabetes. For example, one Canadian study found that, even with other risk factors adjusted for, the relative risk of diabetes increased as much as 10-fold as the degree of overweight increased (see Exhibit 3).

Unfortunately, the percentage of people classified as being overweight or obese is increasing in Canada and most other Western countries. The extent of obesity is often not fully understood, because the most commonly available statistics are based on self-reported weight, which tends to be understated. Nevertheless, regardless of data source, the trend is clearly climbing (see Exhibit 4).

Exhibit 3

Risk of diabetes increases with body mass index (BMI)



*Risk refers to odds ratio (adjusted for age, education, income, marital status, language, ethnicity, region, physical activity level, fruit and vegetable consumption and smoking patterns).

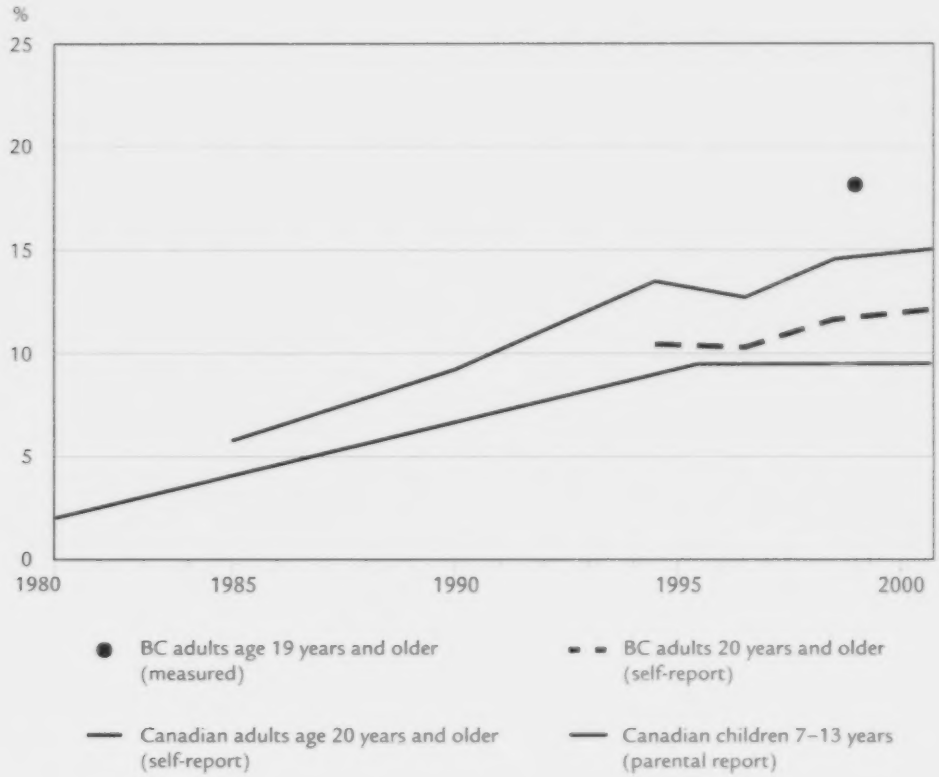
Source: *Improving the Health of Canadians*, Canada Population Health Initiative, 2004.

Body mass index

Body mass index (BMI) is the most commonly used method of describing healthy and unhealthy body size. BMI is defined as a person's weight in kilograms divided by the square of his or her height in metres. A BMI under 25 (for example, being 5'-10" and weighing under 174 lbs.) is considered to be in the healthy weight range. A BMI from 25 to under 30 is in the overweight range, and a BMI over 30 (for example, being 5'-10" and weighing at least 209 lbs.) is defined as obese. Excess fat stored around the waist—central or abdominal obesity—is also a major risk factor for diabetes, whatever the BMI.

Exhibit 4

The rate of obesity is rising in Canada



Sources:

- Canada, adults & children; BC adults, self-report: *Improving the Health of Canadians*, Canadian Population Health Initiative, 2004
- BC adults, measured: *BC Nutrition Survey Report on Physical Activity and Body Weight*, Ministry of Health Services

Obesity and inactivity can lead to type 2 diabetes in genetically susceptible individuals. The process is usually gradual, and it may take several years before diabetes is evident. This lag means that new cases diagnosed today reflect underlying conditions several years ago. And this means that recent increases in obesity, especially in the young, may not yet have had time to show themselves in increased diabetes rates.

Type 2 diabetes has a complex mix of causes

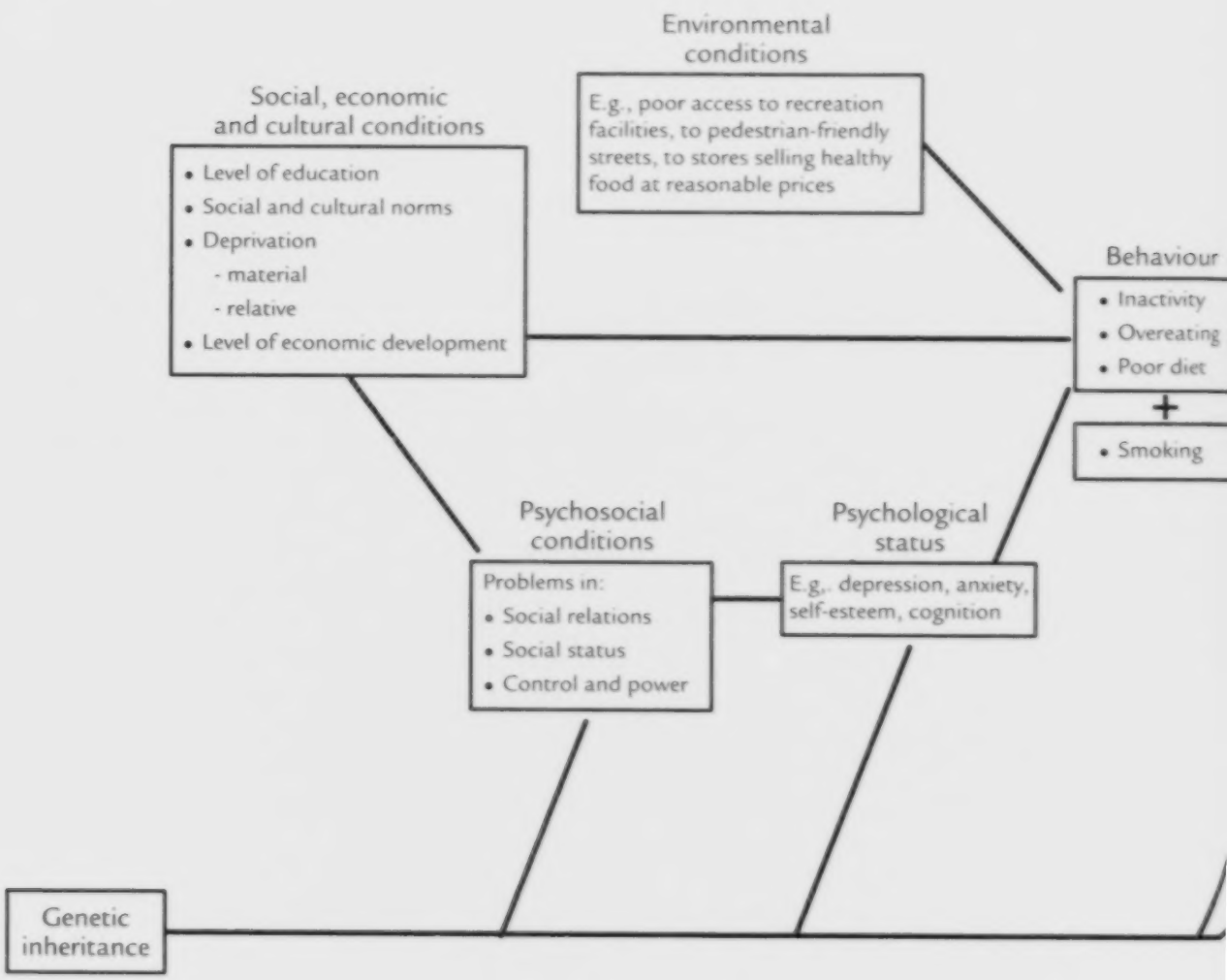
Responding effectively to type 2 diabetes first requires understanding the disease's origins and progression (see Exhibit 5). Many of us have a genetic predisposition to getting diabetes or its precursors. Whether we actually do so depends on the environmental, economic and social conditions in which we were raised and in which we now live, and on our psychological and social resources. All of these manifest themselves in behaviour that increases or decreases our chances of the disease.

These primary determinants of health are important. The Canadian Senate's *Final report on the status of the health care system in Canada* (the "Kirby Report") presented work by the Canadian Institute for Advanced Research indicating that the social and economic environment accounts for 50% of the health status of Canadians, and the physical environment another 10%. By contrast, the health care system accounted for 25% of health status, and biology and genetic endowment 15%. The importance of socio-economic factors in determining good health has been recognized in Canada since at least 1974, when *A New Perspective on the Health of Canada* (the "Lalonde Report") was published.

Health Canada's 2003 report *The Growing Burden of Heart Disease and Stroke in Canada* made this link between socioeconomic factors and chronic disease: "A growing body of evidence suggests that the determinants of health go beyond individual genetic endowment, lifestyle behaviour and the health care system to include more pervasive forces in the physical, social and economic environment...Health policy-makers and analysts have emphasized the need to address these underlying determinants in order to prevent heart disease and stroke. They urge us to direct attention toward modifying not only risk factors and risk behaviours, but also such 'risk conditions' as poverty, powerlessness and lack of social support." Similarly, the UK Department of Health notes the link between socioeconomic conditions and diabetes, in its National Service Framework for Diabetes: Standards: "Type 2 diabetes is more prevalent among less affluent populations. Those in the most deprived fifth of the population are one-and-a-half times more likely than average to have diabetes at any given age. Both mortality and morbidity are increased by socio-economic deprivation."

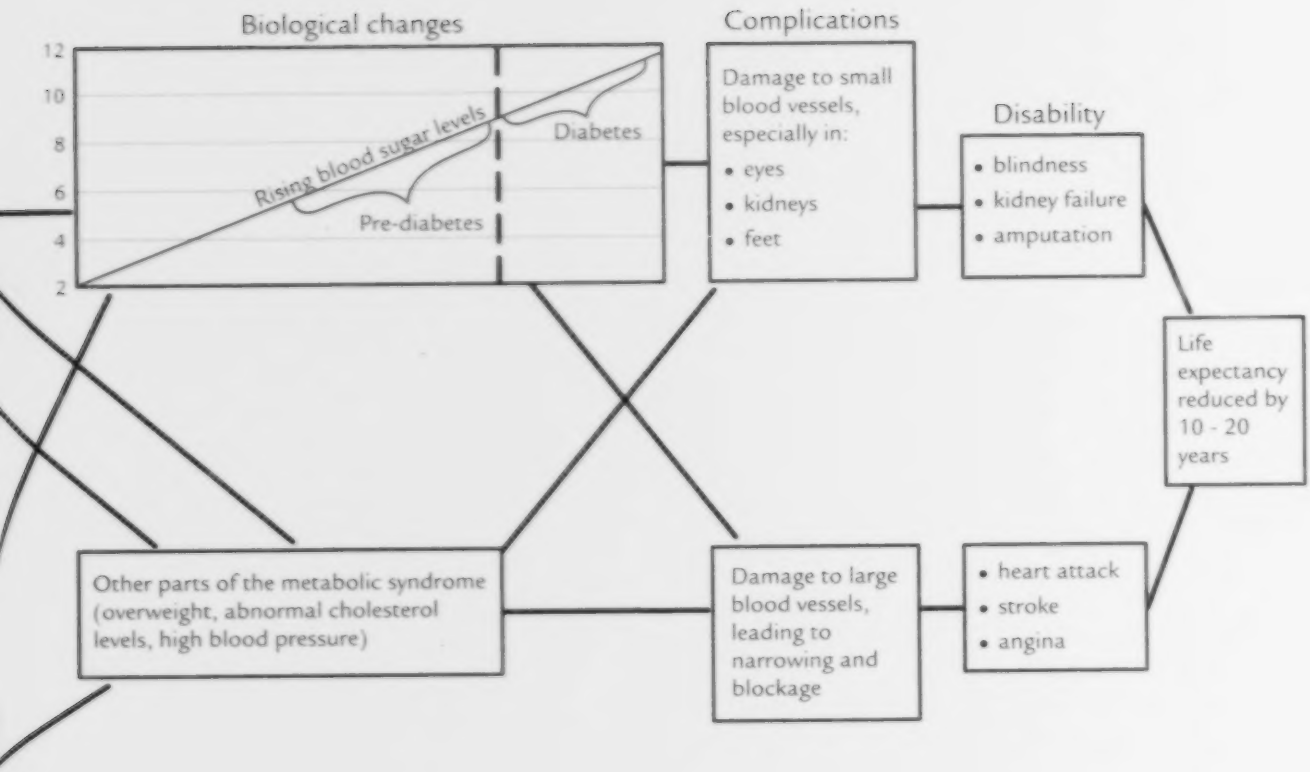
Exhibit 5

The natural history of type 2 diabetes is complex



Source: Compiled by the Office of the Auditor General of British Columbia

Diabetes is a Growing Problem



Diabetes is a Growing Problem

The defining characteristic of diabetes is elevated levels of blood sugar. For most people with type 2 diabetes, their blood sugar levels will have been rising steadily for several years before diagnosis. Even just elevated (and not necessarily diabetic) blood sugar levels are associated with subtle damage to blood vessels. The formal diagnosis of diabetes occurs when blood sugar concentrations reach a level above which damage to small blood vessels is likely to markedly increase. And, the longer blood sugar concentrations are high, the more likely that serious complications will ensue.

Most people who have type 2 diabetes (or are on the way to getting it) have other conditions too—overweight, abnormal cholesterol levels, and high blood pressure. This combination of conditions, sometimes called the metabolic syndrome, sharply increases a person's risk of a cardiovascular disease. Fatal heart attacks or strokes are the main reason that people with diabetes have a life expectancy 10–20 years shorter than the average. Although diabetes is technically defined by blood sugar levels that threaten damage to small blood vessels (in the eyes, for instance), the life-threatening part of the disease is damage to the large blood vessels and heart. This is reflected in the clinical practice guidelines issued by the Canadian Diabetes Association in late 2003: "The first priority in the prevention of diabetes complications should be the reduction of cardiovascular risk...."

The British Columbia government is committed to improving diabetes prevention and management in our province

The British Columbia government has stated its desire to improve the prevention and management of diabetes. One of its overall goals is to "intensify efforts to promote wellness and preventative care through better education, dietary habits and physical activity." The Ministry of Health Planning underscored this desire in a December 2002 document titled *The Picture of Health: How We Are Modernizing British Columbia's Health Care System*. The ministry said, "To achieve health system renewal, we must...[b]etter serve the needs of people who are chronically

ill [and]...[p]ut a greater focus on health promotion and comprehensive approaches to preventing disease, rather than simply intervening once patients become ill. This means doing more to...prevent and control diabetes." Among the actions the government planned to take was a comprehensive chronic disease management program for diabetes that would "give diabetics and their doctors the tools and support they need to better look after their illness." On prevention, the document stated: "The Ministry...is collaborating with the health authorities to develop a chronic disease and injury prevention strategy."

Another indication of the importance the government places on diabetes management and prevention is that each of the three Service Plans issued to date by the Ministry of Health Services has included performance measures related to this matter.

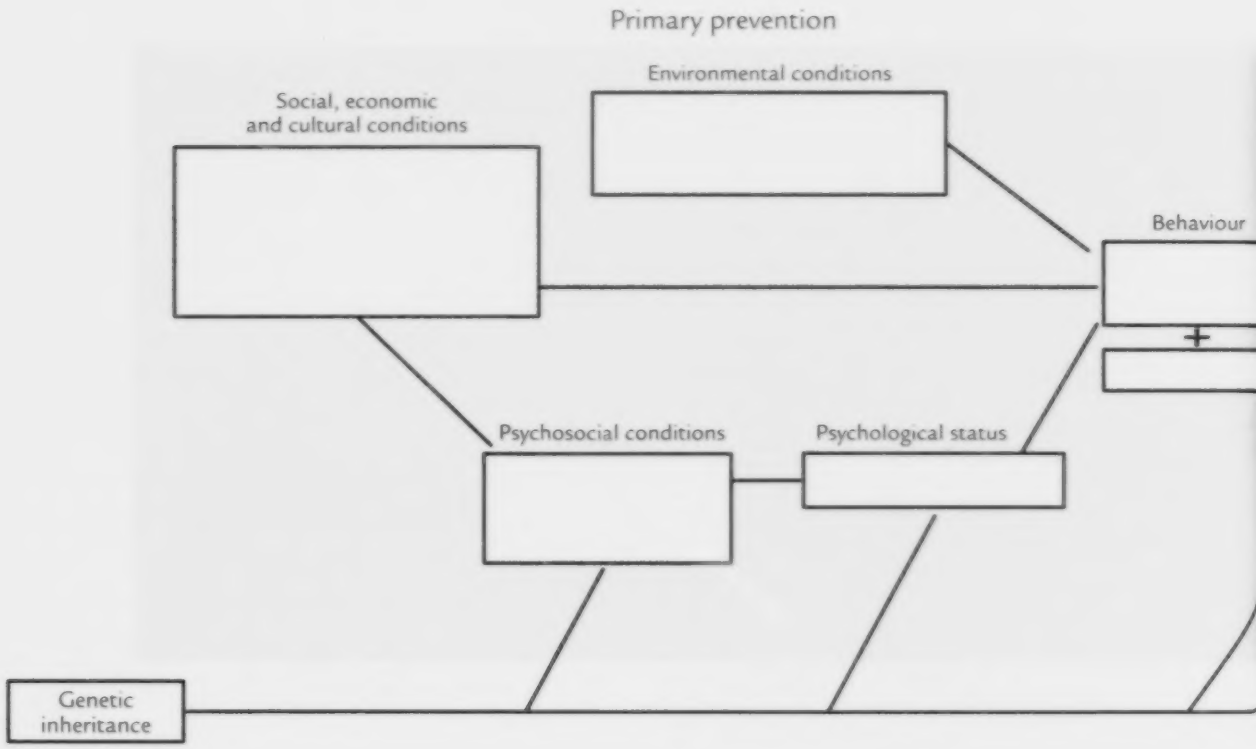
There are three main approaches to preventing diabetes and its consequences

Efforts to prevent diabetes and its complications focus on three different stages in the natural history of the disease (see Exhibit 6):

- *Primary prevention* focuses on controlling environmental factors that impede health, and on encouraging people's capacity to improve their health. It aims to control modifiable risk factors in a population group (such as all British Columbians) where it is difficult to identify with certainty who will develop particular health conditions.
- *Secondary prevention* focuses on identifying specific populations that are at elevated risk of developing a health condition, and using early detection and intervention programs to inform and help those populations.
- *Tertiary prevention* is managing the disease once it occurs. In this case, unnecessary complications and further health deterioration are being prevented. The aim is to minimize suffering and maximize potential years of life.

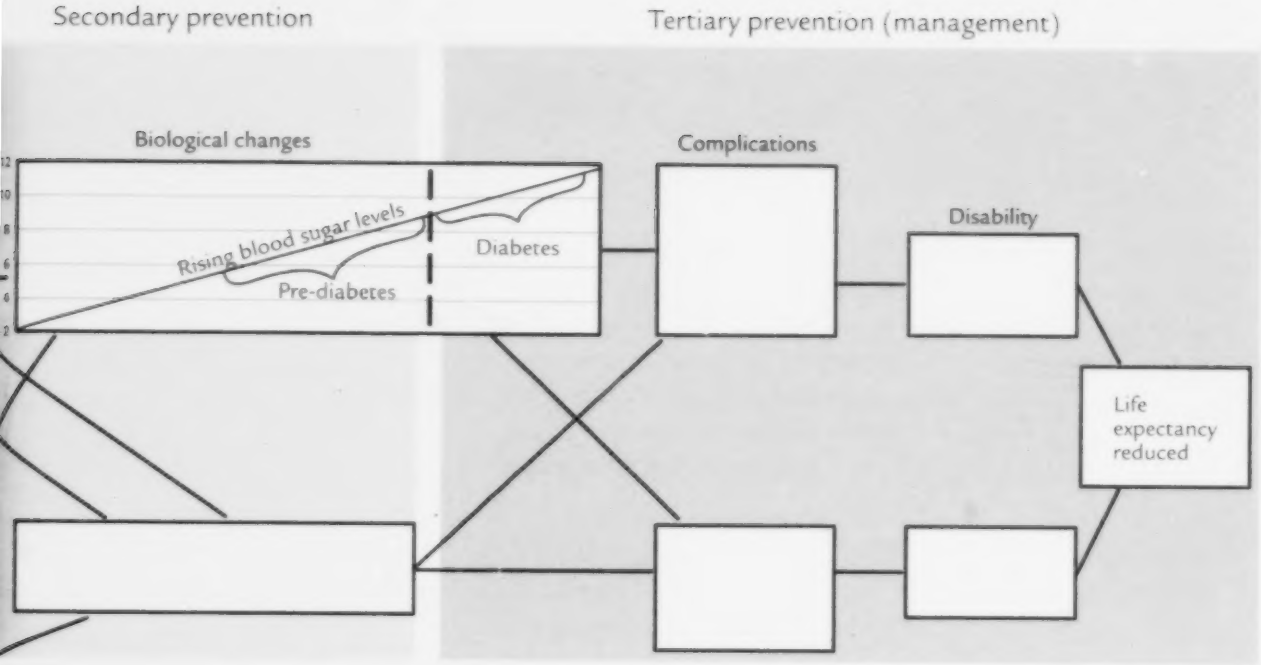
Exhibit 6

Primary, secondary and tertiary prevention focus on different stages of diabetes natural history



Source: Compiled by the Office of the Auditor General of British Columbia

Research to date has found no single intervention, no easy solution that can vanquish diabetes on its own. Success in controlling the disease will require substantial effort, and success, at all three levels of prevention. In the rest of this report, we will discuss each level of prevention in turn, examining how current practices in British Columbia compare to best practice.



Our main focus is on type 2 diabetes, because it affects the largest number of British Columbians, and because many services benefit people with either type of the disease. However, we also highlight situations where management of type 1 and type 2 diabetes differ.

Primary prevention focuses on encouraging the underlying social and physical structures that lead to healthy behaviours. Its "target market" is a broad population—for example, all the citizens of a province. Its concerns can sometimes seem unrelated to health, in the sense of providing treatment to those who are already sick or injured. However, it is an essential part of any effective response to a chronic illness such as diabetes. *Unfortunately, primary prevention efforts in British Columbia are limited.*

Primary prevention is an essential part of efforts to control type two diabetes

Primary prevention is necessary because we have no simple solutions to diabetes. Tools exist at each level of prevention, but research has shown their individual effectiveness to be modest. Only when all the proven tools available at every level of prevention are used can preventing (or mitigating the effects of) diabetes be truly successful.

Primary prevention pays off subtly, by averting the occurrence of undesired health conditions. Often, even major successes will only be detected statistically, through changes in prevalence rates in particular populations.

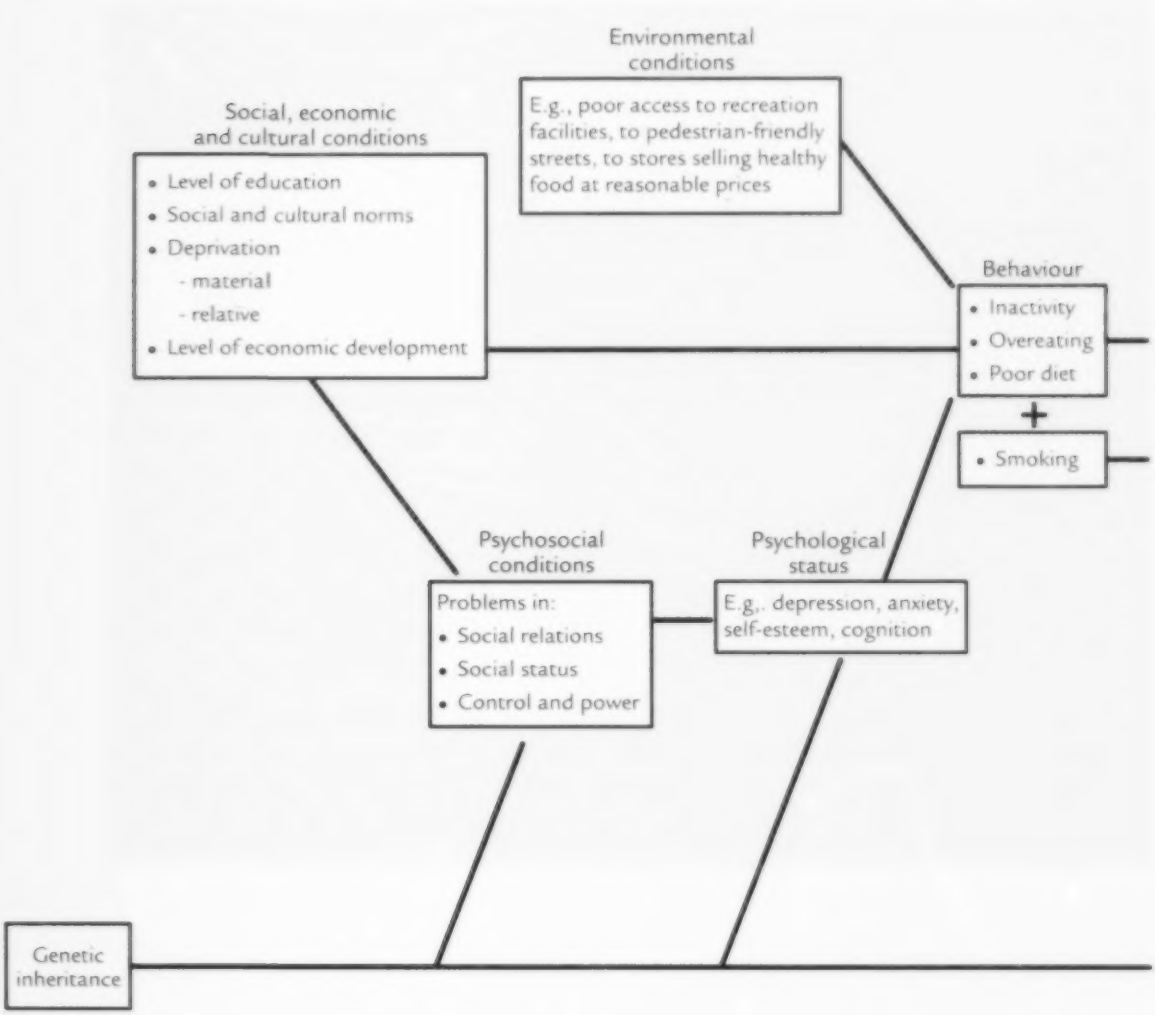
The humane necessity of primary prevention is self-evident. For the person who has it, diabetes is an unpleasant, sometimes life-threatening, condition. It is always more humane to prevent people from developing such a condition in the first place than to provide even the best of care after they do so.

The main goals and messages of primary prevention have a synergetic effect when they dovetail with those of secondary and tertiary prevention. At all three levels, success depends on people being informed and motivated managers of their own life, especially in relation to their eating habits and physical activity.

At present, primary prevention of diabetes applies only to type 2 diabetes. Although extensive research is ongoing, little is yet known about what can be done to prevent the onset of type 1 diabetes in genetically susceptible individuals.

Exhibit 7

Primary prevention focuses on behaviours and their precursors



Source: Compiled by the Office of the Auditor General of British Columbia

The changes that primary prevention seeks to bring about are simple to describe, but difficult to achieve

Many people carry a genetic predisposition to developing type 2 diabetes. Although they cannot change their genetic makeup, they may be able to minimize the conditions that induce their genetic makeup to be expressed. To do this they would have to maintain a healthy weight and be physically active throughout their lives, ideally from infancy on. In particular, they would have to avoid abdominal obesity—that is, putting on excess fat deposits around the waist.

Several steps of primary prevention are therefore obvious. We need to change social, physical and personal conditions such that, as a population, we:

- are physically active;
- reduce our caloric intake;
- reduce the percentage of fat, especially saturated fat, in our diets (and probably, the percentage of simple sugars too); and
- increase our fibre consumption (including consumption of fruits and vegetables).

But clearly, as trends in recent years demonstrate, taking these simple steps is easier said than done. Studies consistently show that even most children are no longer as physically active as they should be, and that activity declines further with age, into and during adulthood. At the same time, rates of excess weight and obesity in the population are rising, and abdominal obesity is increasing even faster.

Effective primary prevention cannot be achieved by lecturing or pleading. Rather, it requires bigger actions: changing both social norms and social settings. As Exhibit 7 emphasizes, the factors that shape our health behaviour are complex and intertwined. Isolated, one-off, interventions are rarely effective. For example, it is little use promoting Canada's Food Guide to people who cannot afford to buy good-quality food, or do not have stores nearby that sell such food, or lack the skills or equipment to prepare it. Similarly, it is no use building playing fields and walking trails if people feel they are at risk of crime when using them.

Success in primary prevention, say the specialists, requires:

1) (borrowing from medicine) the right treatment, given in a strong enough dose, for a long enough time; and

2) (reflecting the complexity shown in Exhibit 7) multiple and coordinated interventions targeted at a variety of different points where change is possible.

Meeting these requirements is not easy, however. As a result, primary prevention has had only a few large-scale successes. The main examples are declining smoking rates, general use of car seat belts and child car seats, and the reduction in tolerance of drinking and driving.

The decline of smoking illustrates what a prevention program needs to be successful

The decline in tobacco smoking in Western countries in recent decades is a good example—perhaps the best—of successful primary prevention. For several decades, governments in Canada and elsewhere have made a concerted effort to reduce the percentage of people who use tobacco, through means such as increased taxes on tobacco, restrictions on smoking in public places, and strong enforcement of laws against selling tobacco to minors. The change in behaviour has been dramatic. In Canada, the number of adults who smoke has declined from more than 50%, in 1960, to 21%, in 2003 (British Columbia, at 17%, has the lowest rate of adults who smoke in Canada). In England and Wales, between 1981 and 2000 smoking prevalence in adults decreased from 43% to 28% in men and from 35% to 24% in women, resulting in an estimated 29,000 deaths from coronary heart disease being prevented or postponed each year.

The tobacco story illustrates the range of actions and amount of effort needed to achieve success. The following quotations underscore this point:

"Experience has clearly shown that reducing tobacco use involves a broad range of strategies from enforcement (prosecuting the tobacco industry, banning advertising, requiring warning labels on cigarette packets, prosecuting those who sell to minors, banning smoking in restaurants and other locations, etc.) through the persuasive (lobbying politicians, forming community

coalitions, educating young people, etc.) to the clinical (counselling, behaviour modification, the nicotine patch, etc.). Moreover, the strategies have to be applied at all levels from the international to the individual, and have to appropriately address specific groups such as young women, while taking into account cultural differences (e.g., First Nations use of tobacco). A comprehensive tobacco control program has to encapsulate all of these—and more."[3]

"Interventions need to be of a sufficient dose intensity and sustained over what may take many years of cultural change before the desired behavioural changes become the norm. For example, smoking behaviours appear to require decades of intense comprehensive multi-level interventions, since new generations keep experiencing afresh the power of this extraordinarily addictive substance....It is simply naïve to expect that less effort than this will pay off..."[4]

Several primary prevention projects are currently underway in the province

During our audit, we learned about several primary prevention projects being delivered by health authorities and their local partners. Two examples in particular—HEAL and Good Food Boxes—have, in our view, potential to be applied more widely in the province.

HEAL (Healthy Eating & Active Living in Northern British Columbia) is a federally funded project administered by the Northern Health Authority. Its objectives are to create support systems that foster sustainable community access to healthy foods and active living, and to increase community awareness of the contribution that healthy eating and active living makes to diabetes prevention. HEAL supports initiatives throughout northern British Columbia, as far south as Williams Lake, including active living projects in five communities, community gardens in seven, and other food projects (e.g., cooperative buying) in five.

The Good Food Box, a concept promoted by nutritionists, is in use in a number of communities in British Columbia and elsewhere. It is a method of buying fruits and vegetables that especially benefits low-income families. By choosing what is in season and buying in bulk, organizers obtain lower prices than exist at grocery stores. Recipes and cooking advice are also

[3] *Framework for a Provincial Chronic Disease Prevention Initiative*, B.C. Ministry of Health Planning, Victoria, B.C., 2003.

[4] "Prevention: Delivering the Goods," John Frank and Erica Di Ruggiero, *Longwoods Review, Vol. 1, No. 2, 2003.*

provided, to encourage families to eat a wider range of foods, including healthy foods they have not tried before.

At least one health authority is involved in school-related primary prevention projects. This is an area of provincial activity as well, with Action Schools! BC, which is an initiative to help elementary school children become more physically active. The pilot phase, now in 10 schools in the Lower Mainland, will include evaluation of health outcomes. The province-wide rollout is expected to start in fall 2004.

Also at the provincial level is the recent release of the BC Nutrition Survey. This report is important because its findings are based on measurement rather than self-reporting. (When self-reporting, people tend to understate their weight and caloric consumption and overstate their physical activity and consumption of healthy foods). The results of the survey show that actual trends in obesity and inactivity in British Columbia are worse than is generally thought, and that many people underestimate their risk from chronic illnesses. For example, the report says, "Almost half of British Columbians consider themselves to be in the maintenance stage for structured exercise, and about 80% report being in the maintenance stage for lifestyle physical activity. Thus, programs designed to increase lifestyle physical activity may have limited impact, as most British Columbians believe they are already physically active." (A person is at "maintenance stage" if he or she is engaged in the right amount and type of physical activity, and only needs to continue at that level to achieve continued health benefits.)

Current primary prevention efforts in British Columbia are insufficient to achieve the desired results

Judged against the two rules for successful primary prevention —right treatment at sufficient dose for sufficient time, and intervention at multiple points—efforts in British Columbia fall short.

Sufficient dose for sufficient time is rare, because most programs have limited resources. Few projects currently underway have assurance of funding continuing long enough for an effective dose to be delivered, relying as they do on short-term pilot grants, one-year funding or the energy of volunteers.

Most projects intervene at only one point, not at a variety of potential change points. For example, Action Schools!BC is designed to encourage those elementary schools involved to make internal changes that increase the amount of time their students spend in organized physical activity while at school. However, such a program is unlikely to be successfully extended province-wide unless broader issues such as funding, provincial curriculum choices and availability of trained teachers are dealt with. Even then, an exclusive focus on activity within school hours may not provide a sufficient dose to change the health status of most elementary-age children. Also required, for example, may be programs directed at parents to have their children walk or cycle to school rather than being driven. Or parents may need to be persuaded to reduce the time their children spend watching TV, using computers or playing video games, and to increase the time they spend in unstructured physical play.

A third problem with present prevention efforts is that existing programs are not population-wide. Most focus on small sub-populations, such as elementary school pupils or residents of specific First Nations communities. Even if successful with those groups, such efforts will have little impact on the overall prevalence of diabetes in British Columbia.

This scarcity of primary prevention activities in British Columbia is in contrast to the range of interventions and intervention points needed:

- Exhibit 7 illustrates the complexity of determining conditions —social, environmental, and psychological—that precede behaviour changes.
- The comments quoted earlier (p. 28) emphasize how many different interventions were needed to successfully reduce tobacco use.
- When it comes to changing eating and activity habits, experience with prevention programs in other jurisdictions shows that many social settings (such as homes, schools, recreational areas, streets and roads, churches, restaurants) and players (such as physicians, teachers, food producers, food processors, restauranteurs, recreation specialists, municipal officials) must be involved.

A British government analysis of what it must do to secure good health for its whole population

In 2002, the British government asked Derek Wanless, the retired chief executive of a major bank, to assess the financial and other requirements needed to provide publicly funded, comprehensive, high-quality health care. In 2003 Wanless was asked to provide an update,[5] focussing especially on how primary prevention could be cost-effectively addressed. In his work, Wanless used economic theory and analysis to put together a framework of tools available to government, and offered guidance on choosing the best tool for a particular task.

The underlying premise of the analysis was that government actions are needed when a market failure prevents the market from providing individuals with the right products or services for healthy living, or when information failures keep individuals from making the right choices from the goods and services offered them.

To counteract these market or information failures, a senior government can use a number of tools, broadly classified as information provision, taxation, subsidies or direct service provision, and regulation. For example, if consumers were bombarded with complex and maybe contradictory information about what constitutes healthy eating, government could respond by providing simplified, accurate information directly (such as by "five a day" campaigns to inform people how much fruits and vegetables should be in their diet). Another option would be regulation (e.g., requiring more comprehensive and easier-to-understand calorie and nutrition labelling on food).

Wanless's report looks in detail at what determines the effectiveness of different policy tools. He points out, for example, that advertising campaigns—often the reflex choice of a government when faced with a public health issue—need to be carefully thought out. As he says, "Advertising campaigns must be designed carefully with the target audience in mind and with clear objectives that are coordinated with other efforts to communicate.... The monitoring of their effectiveness against their objectives should be rigorous as they can be expensive and their impact can vary greatly. Those who advertise goods and services that have adverse health impacts do considerable market research and target their intended audience carefully, using the medium, format, language and presentation of message which they have found is most likely to generate behavioural change. Public health information, if targeted in any less sophisticated manner, will not be equally successful."

- A recent British analysis (see sidebar), using an economic perspective, identified the range of different government policy tools necessary for success.

The provincial government needs to develop an organized strategy for primary prevention of diabetes

What the points of intervention, the players and the policy tools discussed above have in common is that most fall within the responsibility or influence of the provincial (or federal) government. Very few are the responsibility of health authorities, who do not, for instance, set taxation rates or regulate industries. Therefore, successful primary prevention will require concerted effort by the provincial government, both within its areas of direct responsibility and through its relations with the federal government.

[5] *Securing Good Health for the Whole Population: Final Report*, Derek Wanless, February 2004, HM Treasury on behalf of the Controller of Her Majesty's Stationery Office.

What essential elements must a successful provincial primary prevention strategy have? First is the right treatment—that is, one proven to be effective, and properly delivered. This means that the province needs sufficient staff and other resources, appropriately organized, to be able to select treatments demonstrated by research to be effective, and to organize their delivery. Next is sufficient dosage, which implies providing enough resources to deliver programs with real impact, and sufficient coverage of the province. And third is sufficient time: the effort and investment must be sustained long enough to get results—for years, not months or weeks.

The multiple-targets rule of thumb also has implications. One is that resources must be sufficient to ensure that every intervention is able to obtain the desired response. Another is that the suite of interventions selected must collectively result in the desired goal —a province-wide reduction in behaviours that increase the risk of contracting diabetes. To be effective province-wide, all relevant sub-groups of the population must be reached. For example, a print-based information campaign would have to be accompanied by campaigns aimed at people who are illiterate or do not speak English.

The relative cost-effectiveness of possible interventions must also be considered. This can be difficult, as available interventions individually have modest effects. To get the desired level of prevention will require a carefully thought out suite of interventions, targetting a wide range of intervention points, including some that are less than obvious. For example, efforts to help people reach a healthy weight have usually focussed on calorie intake. Unfortunately, research shows that many people find it difficult to lose and keep weight off using caloric restriction alone. Active living must therefore be given as much emphasis as healthy eating in any successful prevention program.

Experience in smoking reduction makes it clear that the critical mass needed to effect real change cannot be achieved simply by adding on more and more low-cost but low-benefit programs (e.g., generalized advertising campaigns). A few carefully chosen and delivered actions with higher cost but higher effectiveness make the critical difference. The cost is often not so much money as it is the political will to persevere against opposition, and the political skill to lead public opinion and

persuade the public of the need for and importance of change. For example, increasing tobacco taxes and restricting smoking in public places—both critical steps in smoking reduction—cost little in dollars but much in government leaders' determination and ability to understand and communicate with the public.

A final point to note about cost-effectiveness in prevention programs is that most interventions aimed at preventing diabetes also reduce the risk of cardiovascular disease and other illnesses. Interventions properly formulated to encourage healthy eating and active living in general will have payoffs well beyond diabetes reduction.

Cost-effective and Cost-saving interventions

The first expectation of any medical procedure or other health-improving intervention is that it be *effective*—that is, demonstrably causing a material improvement. Better are interventions that are *cost-effective*—that is, demonstrating a unit of benefit for less than a certain cost. Best of all are those that are *cost-saving*—delivering a unit of benefit at less than the cost of the least expensive intervention currently used.

Determining cost-effective is difficult because, often, the costs are incurred now but the benefit arises years in the future. For example, a one-year program to help people lose weight by learning better habits of eating and active living may cost several hundreds, even thousand, of dollars per person in that year. The benefits in reduced health care costs may not show up for five years or more. Therefore, the costs and benefits are usually worked out for each year for, say, ten years, then discounted to get a single measure of net benefit. This is then compared to a pre-chosen measure of performance.

For example, the British government's National Institute for Clinical Excellence compared a number of diabetes-related interventions against a yardstick of 20,000 pounds (about $49,000) per quality-adjusted life-year, or QALY (one year of good-quality life added to one person's lifespan). By this measure, they concluded that the following are cost-effective:

- tight control of blood sugar and blood pressure for all people with diabetes
- screening all people with diabetes for eye damage (retinopathy)
- screening people with diabetes who are at high risk of foot damage
- screening obese people for pre-diabetes, and treating it
- reducing obesity and physical inactivity in high-risk groups.

Several of these interventions cost much less than the yardstick. Tight control of blood sugar or of blood pressure in people with diabetes costs only 400-1200 pounds per QALY, and some approaches to blood pressure control may even be cost-saving.

Interventions that have been shown to be (or are likely to be) cost-saving fall into two groups. First are those whose costs are modest, such as giving low-dose ASA to people at high risk of heart attack or stroke, where there is demonstrated benefit and the cost is so low (about $12 a year) that research will probably demonstrate that it is cost-saving. Similarly, the Wanless report points out "The drive towards patient education and self-management strategies is logically compelling, though not as yet evidence-based. There is very little evidence on efficacy and cost-effectiveness. While [the National Institute for Clinical Effectiveness] has highlighted the relative dearth of evidence so far in the area of patient education, it has nevertheless tentatively recommended that structured patient education is made available to all people with diabetes at the time of diagnosis and then as required...[the Institute] stresses that benefits would only need to be modest to justify relatively low costs, with education courses being relatively cheap interventions when compared with drugs."

The other type of interventions shown to be cost-saving are the systematic approaches to care of people with diabetes taken by some American health care organizations. Evidence seems to show that such care, if properly organized and delivered, can deliver better health outcomes at less cost than conventional care.

It is important to remember that showing an intervention to be cost-effective or cost-saving requires extensive and time-consuming research. For many interventions now in use or being considered, this work has not yet been done.

Secondary Prevention of Diabetes

The goal of secondary prevention is to reverse, or markedly slow, people's progression to full-blown diabetes. It has two parts: detecting people who are at imminent risk of developing diabetes, and providing them with treatment to prevent or delay the onset of diabetes. Research has demonstrated that secondary prevention treatments can be effective, even cost-effective. *However, we found very little secondary prevention activity in British Columbia.*

Secondary prevention focuses on identifying, and helping, people who are moving closer to having clinically defined diabetes (see Exhibit 8). It is useful to think of them as having 'pre-diabetes' (more formally, impaired glucose tolerance)—that is, their blood sugar levels are higher than they should be and rising, but are not yet at the level where complications are likely.

As with primary prevention, we focus here on type 2 diabetes. Scientists do not yet know what the precursor stages of type 1 diabetes are, or how to slow or reverse the progression to type 1 diabetes in those who are genetically susceptible.

The effectiveness of secondary prevention has been demonstrated

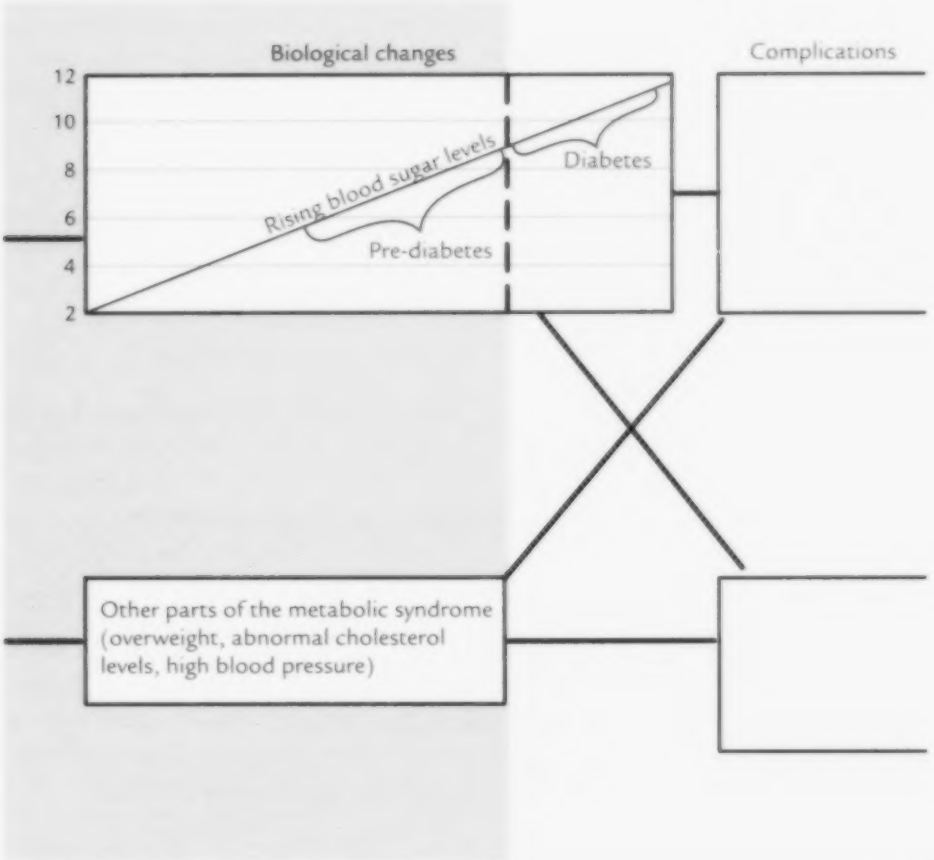
The rationale for secondary prevention is clear: catching people before they have the full-blown disease can prevent or minimize unpleasant, even fatal, complications and costly treatments. And as a side benefit, looking for pre-diabetes can also uncover many undiagnosed cases of diabetes.

Several major studies have demonstrated that relatively straightforward interventions can be effective in reversing or slowing progression to diabetes. For example, if the interventions used in the U.S. Diabetes Prevention Program trial (see sidebar below) were successfully applied throughout British Columbia today, the number of people with diabetes could be reduced in 10 years by over 20% (that is, over 80,000 fewer British Columbians would have type 2 diabetes then).

The spinoff benefit of treating people at high risk of progressing to diabetes is that many of them are also at high risk of cardiovascular disease. Lifestyle interventions proven effective for pre-diabetes—such as losing weight and increasing activity—are also valuable for reducing risk from cardiovascular disease.

Exhibit 8

Secondary prevention focuses on people at imminent risk of diabetes



Source: Compiled by the Office of the Auditor General of British Columbia

Successful secondary prevention relies on three elements

Secondary prevention involves detection (screening) to find people at risk, then treatment. A successful secondary prevention programme requires three key elements:

- cost-effective methods of screening (and of motivating people at risk to be screened);
- cost-effective methods of treatment (and of motivating people at risk to adhere to the treatment, for long periods of time); and

- sufficient, appropriate and appropriately organized resources to deliver both the screening and the treatment (screening without sufficient resources to treat those found by screening has no benefit, and may harm people by raising health fears that they have no way of dealing with).

To be successful, a screening program needs effective tools and good targetting

A number of screening tools are available for pre-diabetes, ranging from simple questionnaires to complex laboratory tests. Choosing the best test, or combination of tests, involves finding the best balance among:

- correctly detecting pre-diabetes when it exists,
- not wrongly identifying healthy people as having the condition,
- cost and complexity, and
- convenience and acceptability.

The last point is important, because people at risk must come willingly to be tested. Available screening tools vary greatly in, for example, speed of administration (from a few minutes to several hours) and intrusiveness (e.g., some require fasting for several hours before taking the test).

Acceptability of a test can be affected by where it is administered. For many people, screening in their family physician's office takes advantage of research demonstrating that simply having their physician tell them their health condition is serious increases the chance that people will make lifestyle improvements. Such external motivation is important: someone with pre-diabetes does not have any outward symptoms of disease, yet has to be persuaded to make significant lifestyle changes now to avoid the future possibility of disease.

Other people are uncomfortable in medical settings, or have not been able to find a family physician, or don't feel they should take up their physician's time asking to be screened. For these people (many of whom fall into groups at higher risk of diabetes), screening programs in other venues such as shopping malls, workplaces or care homes will be necessary.

One tactic that appears effective is staged detection. The first stage is using inexpensive and unobtrusive tests that can be applied in many settings (such as questionnaires) to find those at elevated risk. Only they need undergo more definitive, but also more intrusive and expensive, second-stage tests.

The problem of tests wrongly identifying healthy persons as having a condition (false positives) may not be a major consideration for type 2 diabetes. Most treatments hinge on encouraging healthy eating and active living, which is beneficial for almost everyone and unlikely to cause harm. In such a case, the main cost of false positives is detection and treatment effort invested in those who are relatively low risk.

Because the risk of type 2 diabetes is not uniform, a key element in making screening cost-effective is choosing the right target audience. Since risk increases with age, for example, there is usually little value in screening school children for type 2 diabetes. General consensus is that screening should focus on people with one or more of the following risk factors:

- age over 45,
- being overweight, or obese, or having abdominal obesity,
- membership in a higher-risk ethnic group (First Nations, or of African, Latin American or Asian origin),
- in women, having previously had gestational diabetes or a large baby, and
- having already been diagnosed with elements of the metabolic syndrome such as hypertension or poor cholesterol profile.

There is also consensus that the higher the inherent risk is, the more the frequency of testing should rise and the age of first testing should fall.

Several treatments have demonstrated valuable, albeit modest, effects

Several major studies have recently demonstrated that a useful percentage of people with impaired glucose tolerance can have the onset of diabetes prevented or delayed. Most of the interventions studied (see sidebar) focused on improving diet and exercise, although one study found drug treatment

Treatments used in successful secondary prevention studies

Malmo Study: Middle-aged Swedish men with impaired glucose tolerance received diet and exercise interventions; benefits continued up to the 19-year follow-up, at which point the intervention group showed similar mortality to the normal population.

Finnish Diabetes Prevention Study: Middle-aged significantly overweight men with impaired glucose tolerance received individualized counselling on diet, weight loss and exercise. During the trial, the risk of diabetes was reduced by 58% in the intervention group relative to the control group, and the risk of cardiovascular illness was also reduced. Intervention had five goals: weight reduction of 5% or more, reduction in total fat to less than 30% of energy consumed, reduction in saturated fat to less than 10% of energy consumed, increased fibre intake, and moderate exercise for at least 30 minutes per day. None of the subjects who attained four or five of the goals developed diabetes during the trial.

Da Qing Study: In Da Qing, China, men or women with impaired glucose tolerance were assigned to diet, exercise or combined programs or to a control group. All the interventions (which used individualized counselling) led to a significant decrease in the incidence of diabetes (31–46% reduction in risk) over a six-year period.

Diabetes Prevention Program: A U.S. trial for middle-aged, significantly overweight men and women with impaired glucose tolerance, this program tested both lifestyle and pharmacological (metformin) treatments. The lifestyle treatment included frequent individual contact with coaches, a structured 16-session core curriculum, supervised physical activity and several other features. The risk reduction associated with the lifestyle intervention was higher than that for the pharmacological treatment (although that in itself showed a significant benefit), higher than that found in the Da Qing trial and about the same as that found in the Finnish trial.

helpful in certain circumstances. Several approaches were used to get people to make, and stick with, the needed lifestyle changes, including both individual and group counselling and training.

Translating trial results into practice has some uncertainties

Results obtained during carefully managed and time-limited research projects do not always mean similar results will be obtained in practice. For example, several trials have been able to demonstrate that they delay the onset of diabetes, but fewer have demonstrated true prevention. Thus, over time periods longer than that of the research trial, the overall benefit may be less striking, as people are at risk long enough for the delayed onset to "catch up" with them. Conversely, in some circumstances the trial results may be exceeded. For example, ethical considerations require that people in the control arm of a trial be given "usual care" rather than no care at all. Some researchers believe that what is described as "usual care" in trials is often of better quality than actual usual care.

For these reasons, some caution is needed in extrapolating from trial results. However, the trials described in the sidebar are important because they demonstrate that useful benefits are achievable. Furthermore, a British analysis that examined the treatments used in the Diabetes Prevention Program and Finnish trials concluded that they were cost-effective—that is, the cost of gaining one more year of healthy lifespan (between $26,000 and $50,000) was reasonable.

Taken together, these and similar trials suggest that lifestyle changes are the preferred treatment choice except for young or severely obese people with pre-diabetes (where drugs may be more effective), and that focusing extra effort on encouraging greater physical activity may be especially valuable.

Secondary prevention efforts in British Columbia are limited

We found no organized programs in British Columbia focussed on detection or treatment of people with pre-diabetes. However, some work is being done to provide education and support to those who had already been found to have pre-diabetes (usually, through diagnosis by a family physician). For example, the diabetes education centre in Prince George offers classes customized for those with impaired glucose tolerance.

Management (Tertiary Prevention) of Diabetes

Tertiary prevention is another way of describing the ongoing management of care for people who have diabetes. What is being prevented (or delayed) is the complications resulting from the disease: cure or reversal of diabetes itself is rare by this stage. **Management of diabetes is an important, and costly, activity of the health care system. There is general agreement that this management needs to be better integrated, and *the Province and the health authorities are currently engaged in a number of projects aimed at furthering integration. However, we found that several issues key to successful integration are not yet being addressed.***

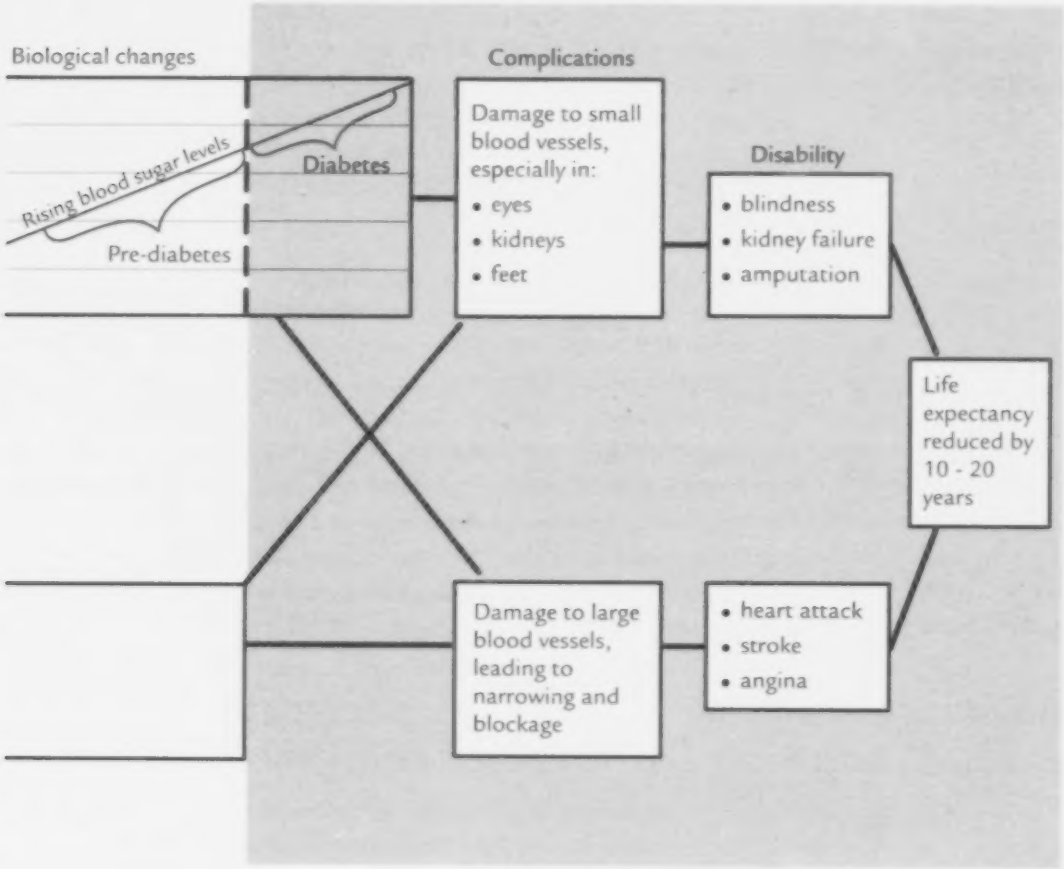
Managing diabetes successfully is a complex task. Since diabetes is a chronic disease, success requires lifelong management with both continuity of care and the flexibility to adjust as the patient ages or other circumstances change. It also requires multiple interventions to manage the diabetes itself, its complications and associated chronic conditions. This means multiple care providers and coordination among them. Finally, successful management of diabetes needs behaviour change by the patient. Many effective interventions require lifestyle changes—and even compliance with medical treatments requires a patient's active acceptance and involvement.

Minimizing the complications of diabetes requires the integration of professional health care and patient self-management

To manage their disease, people with diabetes need care and advice from their family physicians, medical specialists and other care providers (such as diabetes educators). At the same time, they need to be "expert patients," able to make the lifestyle changes required, follow a drug or insulin regimen, and monitor their own condition. To be successful expert patients, they need to understand that self-management is essential and that they can do it. They have to master the attitudes and coping skills needed to take responsibility for managing their own health. As well, they must acquire practical knowledge (e.g., how to plan meals, how to test their own blood sugar levels) to do so successfully.

Exhibit 9

Tertiary prevention is management of care for those with diabetes



Source: Compiled by the Office of the Auditor General of British Columbia

Management (Tertiary Prevention) of Diabetes

The health care system has several important roles in helping people with diabetes become expert patients. Historically, in British Columbia and elsewhere, such education was provided directly by family physicians or specialist physicians. Their work was later supplemented by diabetes education centres staffed with nurses and dietitians with specialist training in diabetes education. More recently, lay-led but carefully organized self-management courses (see Chronic Disease Self-Management courses, below) have been introduced.

Research on diabetes education shows that each kind of information provider has specific strengths. Physicians have a special role to play in making sure patients understand the seriousness of their condition and the need to take responsibility for its management. Diabetes educators ensure that patients understand the technology of their own care; and lay-led courses do well at teaching self-management skills.

Of course, even the most skilled patient self-manager will need help at times. Family physicians, consultant specialists and hospitals all have roles to play in providing this help.

Given this complexity, it is generally agreed that diabetes care in British Columbia can be substantially improved. For example, a recent Ministry of Health Services publication[6] pointed out that "[d]iabetes care guidelines recommend that 80% to 100% of a practice's diabetes patient population should receive certain services on a regular basis. Many of B.C.'s family physicians provide optimal diabetes care and achieve good results. On a province-wide basis, however, there is room for improvement." Exhibit 10 shows that the proportion of people with diabetes receiving recommended care, both as a provincial average and regionally, is below the recommended level.

[6] *Chronic Disease Management: A Snapshot of Diabetes Care in British Columbia 2000/2001*, Ministry of Health Services, Victoria, B.C., October 2002

Exhibit 10

Proportion of people with diagnosed diabetes receiving recommended care in British Columbia, 2000/2001

Recommended care[a]	Percentage who received care		Recommended percentage
	Provincial Average	Range[b]	
At least two HbA1c tests (measure of average blood sugar levels) within the year	39	28–47	80–100
At least one eye exam within two years	47	40–58	80–100
At least one microalbumin (kidney function) test per year	30	25–42	80–100
At least one lipid (cholesterol) test within three years	72	53–80	80–100

[a] Recommended in the BC Clinical Guideline for Diabetes, developed jointly by the Ministry of Health Services and British Columbia Medical Association

[b] Highest and lowest percentages among the 16 health services areas (subdivisions of health authorities).

Source: *Chronic Disease Management: A Snapshot of Diabetes Care in British Columbia 2000/2001*, Ministry of Health Services, Victoria, B.C., October 2002

Care can be improved by being organized around a research-supported integrating model

The provincial government does not have a strategy focussed solely on the management of diabetes. Instead, it has chosen to pursue two wider strategies for improving care for a number of chronic and acute conditions, including diabetes: chronic disease management and primary care renewal. The structure it has adopted for improving chronic disease management is an expanded version of the Chronic Care Model, a well-accepted and research-supported model developed in the United States by the Group Health Cooperative of Puget Sound and the Institute for Healthcare Improvement. The key elements of the model are listed in Exhibit 11.

Exhibit 11

Elements of the Chronic Care Model

Organization of health care

- visible support from senior management
- measurable goals in business plans
- allocation of specific resources
- incentives to motivate providers and patients

Delivery system design

- responsibility taken by patient's primary care provider to ensure continuity and coordination (e.g., with specialists)
- follow-up customized to efficiently assure goals are attained
- case management for complex cases

Clinical information systems

- treatment plans, established in cooperation with patient
- population-based information systems: patient registries, linked to guidelines and to prompting and recall systems
- effective feedback to team on how to improve its performance

Decision support

- appropriately trained practice team
- clinical practice guidelines integrated into everyday practice (preferably electronically)
- involvement of specialists in decision support

Self-management support

- emphasis on patient's central role
- resources assigned to support self-management
- effective support strategies: assessment, goal-setting, action plans, problem-solving, follow-up

Community resources

- disease management links to healthy public policy
- effective links by patients to community recreational and social services

Currently, a number of pilot projects are exploring aspects of providing better diabetes management

The Ministry of Health Services is currently funding a number of pilot or demonstration projects aimed at improving chronic disease management. These projects are in alignment with the Chronic Care Model, although none encompasses all aspects of the model. Several of these pilot projects are relevant to improving diabetes care, as are a number of initiatives being carried out directly by the health authorities.

Diabetes Mellitus Structured Collaborative

This collaborative has been initiated by the British Columbia Medical Association through a grant by the Ministry of Health Services, and will build on experience gained through a previous collaborative for congestive heart failure. The long-range goal of such collaboratives is to help build infrastructure in the province that will maximize the length and quality of life for patients with chronic disease, and satisfy patient and caregiver needs, while maintaining or decreasing the cost of care. This will be achieved by implementing a system-wide model that focuses on changing physician practice and improving interactions between patients and providers. The collaboratives make use of the ideas in the Chronic Care Model, and the learning and change ideas developed by the Institute for Healthcare Improvement. One of the diabetes collaborative's first activities has been to test the latest BC Clinical Guidelines for Diabetes, developed jointly by the ministry and British Columbia Medical Association, and updated recently to reflect changes in national guidelines.

Patient registry and recall system

The Ministry of Health Services has developed a "virtual" registry of people with diabetes, identifying them by looking for evidence of diabetes-related services in Medical Services Plan, Pharmacare, Pharmanet and hospital records. From that information each person's prime physician is also identified. The data are then combined to produce a register of all the people with diabetes being served by that prime physician, who can access his or her register through a secure Web connection, find out how many of his or her patients have diabetes, what their particulars are, and

how their management compares to provincial standards. The system is being expanded to provide a recall and reminder service so that physicians can note which patients are not coming in for regular visits and remind them to do so.

Chronic Disease Self-Management courses

The Ministry of Health Services has arranged for the University of Victoria's Centre for Aging to train leaders to give chronic disease self-management courses in each of the health authorities. The courses were developed by a leading international authority, Professor Kate Lorig of Stanford University. They recognize that people with chronic illness must deal daily with common issues such as pain management and stress, and need to develop coping skills.

The courses are highly structured and led by teams of trained lay volunteers who themselves have a chronic condition. Topics include how to problem-solve, how to communicate effectively, how to work effectively with health care professionals, and how to evaluate treatment options.

Chronic Care Practice Enhancement Incentive Pilot Project

This is a two-year pilot project under which participating family physicians receive an annual fee for each patient with a confirmed diagnosis of diabetes whose clinical management is consistent with the recommendations outlined in the BC Clinical Guidelines for Diabetes. (The fee is also available for appropriate treatment of patients with congestive heart failure.)

Health authority initiatives

As well as partnering with the provincial government in projects, health authorities are engaged in self-developed pilot projects. Examples particularly related to diabetes management include:

- The Vancouver Island Health Authority and its predecessor organizations have for more than five years had an umbrella group—Do-It (Diabetes Outcome Improvement Team)—that has sponsored a series of incremental improvements in diabetes care.

- The Interior Health Authority is piloting two chronic disease centres in the Okanagan. These will integrate educational and lifestyle services for people with diabetes, heart disease or kidney disease. One aim is to avoid duplicating services to people with more than one of the conditions.
- The Vancouver Coastal Health Authority has three pilot projects of interest. The first is a collaborative project with an adult day-care centre to provide better management and monitoring for the many attendees at the centre who have diabetes. The second is a project in which case managers will coordinate the services the health authority provides to people with particularly complex mixes of chronic and other conditions. Finally, the health authority is working with a local community recreation centre to develop a wellness program for those with a chronic condition, initially focused on people with diabetes.

Efforts to improve the delivery of primary care

Primary care—first-line medical care provided by family physicians—is a critical element in the management of chronic diseases, and is a cornerstone of the Chronic Care Model. Funds from the federal Health Transition Fund have been distributed to the health authorities for use in several projects demonstrating innovative approaches to improving the delivery of primary care.

To implement an effective "made-in-B.C." chronic disease management system, several systemic issues have to be addressed

The various pilot projects discussed above should provide useful help in developing an integrated system of diabetes management here in British Columbia. However, when we compared the present situation in British Columbia to the Chronic Care Model, and to care delivery in other jurisdictions, we found four issues that are likely to be critical to the success of improvement efforts but are not being fully examined. This, in our view, stands in the way of successful improvement of chronic disease management in our province.

What information is needed to manage diabetes cost-effectively, and what technology investments are required to collect and manage this information?

Effective tertiary prevention of diabetes is impeded by lack of information. A clear picture of the population dimension of diabetes management does not exist (information necessary for policy and funding decisions); and there is no integrated information-sharing about individuals with diabetes (information necessary for optimal patient care).

At the population level, several information gaps are apparent. Not known in detail, for example, is who has diabetes but is not yet diagnosed, who is receiving services from both a family physician and a diabetes education centre, or who has diabetes but has never received diabetes education.

These are important questions. For example, although data on who is or is not served by diabetes education centres are sparse, many centre staff told us they believe they are not reaching all local people with diabetes. In particular, no diabetes education centres we visited felt that they were attracting a sufficient number of First Nations people.

We think the ministry's patient registry and recall system (described on p. 48 above) is a clever and relatively inexpensive way of developing both some population statistics and practice-level patient listings. However, it is not clear that it can be expanded to the next level—a system for keeping individual patient information and sharing it electronically with all caregivers who need it.

In both the Chronic Care Model and in current practice in British Columbia, the family physician is the cornerstone of chronic disease management. Linking family physicians into an information system is essential. Experience elsewhere, especially in the United States, suggests that such an integrated information system is the best way to achieve better health results without increasing overall cost—but it does require significant capital investment.

Including family physicians in private practice within such an integrated information system is especially difficult. Many practices are not computerized, or lack high-speed data connections. Paper patient files are still common.

One likely reason for this limited adoption of computerization is cost. Comprehensive information systems have capital costs in the order of several tens of thousands of dollars per doctor, and operating costs of several thousand dollars per year per doctor. Most family physicians in private practice are paid on a fee-for-service basis. An economically rational physician would invest in information systems only to the extent that the investment allows him or her to provide more billable services. However, many benefits of integrated information systems (for example, through fewer duplicate laboratory tests or X-rays) accrue to parts of the system outside the doctor's office. In our opinion, unless ways are found to pay physicians for the difference between what such in-office systems cost and what they are worth financially to them, integrated information systems are unlikely to succeed.

Developing information systems that include family physicians in private practice is not being examined in any of the primary care pilots currently underway in the province. Nor is the problem likely to be solved through the Chronic Care Practice Enhancement Incentive Pilot Project.

We note that another feature found in successful applications of the Chronic Care Model elsewhere (e.g. Kaiser Permanente health plan in California)—having other health care practitioners (such as nurses with specialized training) work with family practices—also faces financial barriers in British Columbia. Under the province's fee-for-service system, family physicians must personally deliver a service in order to bill for it.

How can we make best use of diabetes education centres and of the skills of their staff?

Diabetes education centres are staffed with nurses and dietitians who have taken further training and certification as diabetes educators. Such educators are an essential part of integrated chronic disease management systems such as the Chronic Care Model. In each of the province's health authorities we visited, we found a recognition of the value of these staff, but a lack of consensus on how best to make use of their skills.

The service model currently in use was similar in all the health authorities we visited: a centre, usually housed in a hospital, offering small group education to people with diabetes or pre-diabetes (one-to-one education is used for those for whom group classes are a barrier to learning). Some centre staff told us they believed that a wider range of delivery models was needed to more effectively serve clients, especially those who find the present service model uncongenial (such as many First Nations people). Despite this, we found few variations in service model. A few diabetes education centres have successfully expanded their roles to include case management as well as education, but this approach does not appear to be being considered more widely. Some successful systems in the United States have their educators act as outreach workers, going out to family physician offices to work directly with both patients and physicians there. This model is not currently being explored in British Columbia.

We believe one reason that different models of delivery are not being tried is resource limitations. In our interviews, we found both health authority administrators and diabetes education centre staff preoccupied with finding ways to keep operating within constrained (usually reduced) budgets. Maintaining acceptable levels of service to current clients took precedence over looking for innovative ways to provide more, or more effective, service. Some centres have succeeded in finding ways to reduce costs without reducing services (for example, several centres in the South Okanagan have set up a joint telephone booking system.) In many cases, however, centres had been facing declining budgets for several years and are unable to find further cost-cutting areas other than patient education. Common methods of reducing these costs are to deliver more service in group sessions, rather than one-on-one; to increase the size of groups; and to reduce the number of hours of teaching offered each client.

Unfortunately, educators are unable to determine whether these changes reduce the effectiveness of their programs, because little information is collected about how well the programs benefit clients. This is part of a larger problem. For various reasons, diabetes education centres in British Columbia collect little performance information. The norm is to focus on input measures of services

provided (visits, attendance in a class, hours of class time), rather than on more client-specific outcome information. This dearth of performance information, especially effectiveness information, puts diabetes education centres at a disadvantage in competing for scarce health authority funding, especially against high-profile acute care services.

Health authority administrators face a dilemma: they have difficulty in devoting scarce resources either to a program that cannot demonstrate effectiveness or to development of the information system needed to demonstrate that effectiveness. (As well, administrators will get little help from looking at other jurisdictions, as the research literature does not give clear guidance on which diabetes education centre practices are effective.)

Finding solutions to these issues is important because diabetes education centres can play an important role in integrating service delivery to people with diabetes or pre-diabetes. In a sense, they lie at the crossroads of diabetes management: operated by health authorities, their clientele is referred to them by family physicians, while the educational work they do complements self-management education courses.

How can we ensure continuity of care of patients' diabetes while they are in hospital for other conditions?

The financial cost of diabetes lies largely in the cost of treating the complications of the disease and of its allied conditions. Many of these costs result from more frequent use of hospitals and other acute care services.

For people already actively managing their health conditions, the issue is ensuring that a hospital visit for treatment of a complication does not impede continued good management of the diabetes. Ensuring this involves a number of technical issues, including communication from hospitals to family physicians and hospital policy on patient-provided drugs.

For people whose diabetes is not well controlled (or not yet detected), a hospital visit offers them a chance to be diagnosed, educated, and set up with a management plan. Doing this also involves managing and coordinating a number of technical issues, including how best to use diabetes educators. Unclear, for example, is whether it is more cost-effective to disrupt planned classes in a diabetes education centre and have the educator come to the ward to give one-on-one instruction to a newly diagnosed person with diabetes, or to have the educator train ward nurses on how to give first-level instruction.

Of the present pilot projects, only those looking at case management appear to address this issue in any way.

How can we best manage the transition to adulthood for children with diabetes?

Diabetes puts a difficult burden on children, demanding of them adult levels of knowledge, self-awareness and self-denial. Adolescence, with its physiological and psychological changes, makes diabetes management even more difficult. Helping adolescents with diabetes manage their condition and, at the same time, shift from support structures designed for children to those designed for adults, is a difficult task. Other jurisdictions, such as Great Britain, have developed programs which keep in touch with people with diabetes as they make the transition to adulthood. Such programs appear to be a reasonable response to a difficult problem, although not a panacea. At present, although British Columbia has a system for providing care to children with diabetes, there is nothing specific for adolescents and young adults.

The Province has made a good start at reporting on its performance in preventing and managing diabetes. ***Existing performance measures now need to be broadened and deepened to give a more complete picture of progress.***

Diabetes prevention is a complex activity, with many points of intervention, so accountability reporting for prevention needs to match that complexity. For example, full reporting would need to include meaningful suites of measures for each of primary, secondary and tertiary prevention.

The Province has made a good start at developing, and reporting on, performance measures. The Ministry of Health Services' annual service plan reports include two measures (with targets) related to primary prevention (percentage of the population who are physically active enough to attain health benefits, and percentage with healthy body weight) and two related to tertiary prevention, or diabetes management (percentage of people with diabetes receiving at least two HbA1c—blood sugar—tests during the year, and potential years of life lost due to cardiovascular disease). The ministry also supports its diabetes-related chronic disease management initiatives with websites and newsletters that expand on these indicators (by, for example, reporting regional variations in HbA1c testing rates).

These measures are a good beginning, but need to be expanded in both breadth and depth:

- breadth: covering all stages of the diabetes life cycle by, for example, developing secondary prevention indicators, and primary prevention indicators for precursors to behaviour such as socioeconomic and environmental conditions (see Exhibit 5); and
- depth: making existing measures more meaningful and giving them context.

For example, one area where depth could be improved is the physical activity and healthy weight measures, which are self-reported. Readers of the service plan should be advised of the limitations of self-reporting (that is, people tend to overstate activity and understate weight). Reporting on HbA1c testing could be improved by making it clear that the testing rate is only

for people who have a primary care physician. For context, this measure should be accompanied by an estimate of how many people with diabetes are not under a doctor's regular care.

An important aspect of performance reporting is making clear how the measure being reported is supposed to link to government activity. This is important information for health issues with complex genetic, biological and social influences. For example, as our population becomes older on average, problems of youth (such as the number of people committing violent crimes), diminish, while problems of age (such as the number of people with dementia), increase—regardless of government efforts. So, an important part of any reported measures is not just the target set, but the reason for that target. For example, in its 2004/05–2006/07 Service Plan the Ministry of Health Services set HbA1c testing targets as follows: 40% for 03/04; 45%, 04/05; 50%, 05/06; 55%, 06/07. The ministry suggests that the desired level is 80–100% (see p. 45). This implies that it will take until 2011/12 to reach the minimum desired level. Is tnat the ministry's intention? Explaining the rationale for a goal is an important part of making that goal a meaningful accountability tool.

Performance measures are an essential part of accountability for performance. But developing performance measures, and their underlying information sources, is rarely easy or cheap. To be most cost-effective, such work should be coordinated, to avoid false starts and duplication. Better, it should be linked to performance management so that, as much as possible, measures developed for management purposes are equally useful for accountability purposes.

Recommendations

It is clear that the provincial government wishes to have an effective program for prevention of diabetes and its consequences. Equally clear, as our audit shows, is that such a program is not yet in place. Much is being achieved in diabetes management (tertiary prevention), but more is needed. As well, in primary and secondary prevention, while some laudable local efforts are being made, nothing resembling a province-wide program exists.

Our recommendations in this audit have several unusual features

Often, our audits examine the processes used to implement a particular policy decision within a particular ministry or agency. In such a situation, what to address in recommendations, and who to address them to, is relatively straightforward.

Not so in the present audit. In essence, what we have found is not a program requiring relatively modest changes, but the absence of an organized program. Our recommendations, therefore, have to start from first principles. For diabetes prevention, these principles are:

- Intervention choices must be evidence-based. Nothing is gained by expending money and effort on ineffective interventions, no matter how easy, popular or inexpensive they are. Broadly, in primary prevention, effective interventions are likely to be those that provide the right treatment in sufficient dosage for sufficient time, and are targetted at multiple points of intervention. In secondary prevention, effective interventions would likely use treatment plans similar to those in recent successful trials such as the Diabetes Prevention Program. In tertiary prevention, effectiveness would likely result from care delivery organized using an integrated approach to management, as exemplified by the Chronic Care Model.
- Although many interventions have been demonstrated to have beneficial effects, in general the benefits of any one intervention are modest. Success in fighting diabetes therefore depends on applying a large enough ensemble of moderately effective interventions, at all three stages of prevention.

Recommendations

Who to address our recommendations to is also problematic. Should they be addressed to both the government and the health authorities, since all have important roles in the delivery of diabetes prevention? We certainly expect government to make good use of the skills and knowledge residing in the health authorities. However, our recommendations will be directed at the provincial government, both because of its lead role in directing and funding health authorities and because most tools for primary prevention rest in government's, not the health authorities', hands. Further, we address our recommendations to the provincial government as a whole, not just the Ministry of Health Services, because most primary prevention tools are held by other ministries—such as Finance, Transportation, and Education—not by Health Services.

Given the large gap between government's general policy goal—effectively managing and preventing diabetes—and programs in place to reach that goal, we did not think it useful for us to make detailed recommendations. Instead, we recommend an organized process for choosing the best mix of program efforts to fill that gap. The first step would be to search out potentially effective and research-supported methods of prevention and management. These could be found both in work done elsewhere, and in innovations in use in one part of British Columbia but not yet universally adopted. This step would include determining—through pilot projects or other means—the effectiveness of these methods when applied in British Columbia.

With this information assembled, the second step would be to develop a well-supported set of implementation strategies, including documentation of the costs and benefits (in medical, social and financial terms) of applying the recommended methods of prevention, and of not doing so.

Research has shown many prevention interventions to be *effective* (effectiveness being the standard applied to most health care). Only some are also *cost-effective*—that is, producing "units of health" at less than a predetermined cost per unit. And even fewer are *cost-saving*—that is, delivering more "units of health" for the same cost as the intervention currently used. In other words, it is likely that spending will have to increase if diabetes prevention is to be successful.

Moreover, diabetes will not go away by itself. Indeed, indications are that the disease will continue to increase in prevalence unless significant government interventions occur. In reality, the choice is how to intervene in a way that balances the interests of the present and the future. As a society, we today enjoy the benefits of societal choices such as cheap and convenient automobile travel and easy availability of calorie-rich food—choices whose side-effects will lead to increasing diabetes in the future. Well-designed and delivered efforts (and thus expenditures) now will mean a healthier, more productive population (and lower health care costs) in the future. Minimizing effort now leaves future generations with a health deficit, and the financial consequences of that.

What this all means is that the next decisions required would not be administrative, but rather choices about the allocation of public funds and about intergenerational equity: both clearly policy decisions. Therefore, at this stage the strategies would need to be submitted to Cabinet. Our recommendations explicitly recognize that tough choices will have to be made—choices that are rightly the prerogative of our elected representatives.

After those choices are made, administrative officials (including those in the health authorities, when applicable), would take over, to implement the methods of prevention chosen by Cabinet in such a way that they can achieve their optimum effectiveness and be sustained long enough to make a difference.

We recommend that the provincial government engage in an organized process to:

1. **Search out potentially effective and research-supported methods of preventing diabetes and its consequences, and determine through pilot projects or other means the effectiveness of these methods when applied in British Columbia.**

2. **Develop, and provide to Cabinet, well-supported strategies for prevention, including documentation of the costs and benefits (in medical, social and financial terms) of applying the recommended methods of prevention, and of not doing so.**

3. **Implement the strategies chosen by Cabinet in such a way that they can achieve their optimum effectiveness and be sustained long enough to be effective.**

Response from the Ministry of Health Services and from the Provincial Health Services Authority

Response from the Ministry of Health Services

Overall Comments

The Ministry of Health Services (MOHS) welcomes the Auditor General's report, Preventing and Managing Diabetes in British Columbia. It is hoped that this report will not only help raise public awareness of diabetes as a growing health problem, but also draw attention to the social and health care changes needed to address diabetes.

Over the past three years, British Columbia has made significant progress in the enormous task of working towards the management and prevention of major chronic diseases, including diabetes. Progress has been so successful that, nationally, British Columbia is considered to be a leader, breaking new ground with initiatives focused on improving health outcomes for patients with chronic diseases.

This report focuses on the time period prior to January 2004, thereby missing some important progress. The Ministry appreciates the opportunity to reference recent achievements since the research phase of the audit was completed. The inclusion of information as well as further clarifications to the report will allow for a more accurate description of MOHS work in prevention and management of diabetes in the province.

The report accurately describes the burden of diabetes in British Columbia. The health consequences of uncontrolled diabetes can be devastating for patients, their families and their caregivers. Diabetes, like other major chronic diseases, also places enormous pressure on the health system and is extremely costly to government and to society as a whole.

MOHS has identified effective prevention and management of chronic disease, including diabetes, as a central element of our plan to achieve government's three overarching goals for the health system — namely: high quality patient care, improved health and wellness of British Columbians, and a sustainable, affordable health care system.

Rather than dealing with one disease at a time, strategies have been developed to address the root causes or common risk factors — poor diet, physical inactivity, and tobacco use — common to a number of chronic diseases, including type 2 diabetes, cardiovascular disease, chronic respiratory disease, and some cancers. These strategies are based on a comprehensive review of the growing, international evidence on chronic disease prevention. Similarly, our goal is to improve the quality of health care for people with diabetes and other chronic diseases by employing an evidence-based framework applicable to all such diseases, called the

Expanded Chronic Care Model. This model of care identifies the essential elements needed to improve both prevention and management of chronic disease, including healthy public policy and supportive environments, strengthened community action, clinical practice guidelines, clinical information systems and self-management support. It is adapted from the "Chronic Care Model" developed by a United States national program called Improving Chronic Illness Care based at the MacColl Institute for Healthcare Innovation in Seattle, Washington.

As the Auditor General's report notes, much remains to be done in the area of chronic disease prevention and management. Equally noteworthy, however, is how much progress has been made over the past three years in defining the way forward. We are now well positioned to make further gains. The Auditor General's report calls for an organized process to identify and implement well-supported strategies. It is our view that such a process exists already, in the form of the Expanded Chronic Care Model described above. Furthermore, there is strong evidence that the broad, collaborative character of this approach will produce more profound and enduring change than a disease-specific government program such as that proposed in the Auditor General's report.

Effective prevention and management of chronic disease cannot be accomplished by MOHS alone or even primarily. The Ministry's role, as steward of the health system, is to mobilize health authorities, health care professionals, patient advocacy groups, other ministries and governments, the voluntary health sector, the private sector, and individual British Columbians to work together to define and implement the many social, environmental, lifestyle, and health care system changes required.

Prevention of Diabetes and Other Chronic Diseases

Disease prevention is a priority of MOHS, a focus of the Ministry's Population Health and Wellness Division, and a central component of the Chronic Disease Management strategy. While the Auditor General's report mentions this briefly, the Ministry welcomes this opportunity to convey the breadth and value of current preventive initiatives.

There are no known effective primary preventive measures for Type 1 diabetes and only two effective primary preventive measures for Type 2 diabetes: healthy eating and physical activity, both of which contribute to maintaining a healthy body weight. Both these practices need to start early in life — although it is never too late to start — and continue throughout life. Unfortunately, neither of these key preventative measures lie wholly within the mandate of the Ministry or even within the sole jurisdiction of the Provincial Government. Instead, they are individual/societal lifestyle choices. Improving the choices that people make about eating and exercise will require a change in individual/societal values and the creation — by communities, organizations, and society as a whole — of conditions that encourage and support people in adopting a health-promoting way of life.

For this reason, effective primary prevention of chronic disease in general, and diabetes in particular, requires close collaboration among a wide range of partners. The different levels of government, health care professions, the private sector, voluntary and community sectors, and individual British Columbians: all can contribute to the creation of health-promoting environments and lifestyles. The Ministry's current prevention strategy reflects this reality. We are working with partners in various sectors, and at all levels to raise public awareness, knowledge, and skills; create environments that permit and promote healthy lifestyle choices; and increase the capacity of the health system to identify and sustain evidence-based policies and services.

While there are many examples of excellence in chronic disease prevention within and beyond the health service sector in BC, we agree that there is a need to coordinate and intensify our efforts. Over the last three years, the Ministry has focused on strengthening our platform for chronic disease prevention by reviewing evidence, developing a strategic approach, building partnerships, and supporting key prevention initiatives.

Initiatives encompassed in our present strategy include:

- *Surveillance*
  - *We are in our fifth year of participation in the National Diabetes Surveillance System (NDSS), which has enabled us to identify and monitor the incidence, prevalence, and complications of diabetes in British Columbia by applying NDSS software to administrative databases. This information provides a solid foundation for the planning and management of diabetes prevention and care.*
  - *A recently published report of the BC Nutrition Survey provides the first major update on the eating habits of adult British Columbians since the 1970s and is being used by government and health organizations to support planning.*
- *Core Public Health Functions — MOHS recently identified health improvement and chronic disease prevention activities as core functions of health authorities. In consultation with the health authorities, we will be defining expectations, benchmarks, and indicators.*
- *Strategic Support — Over the past 18 months, MOHS has prepared five major evidence/directional documents for health authorities and stakeholders to support effective planning and capacity-building for chronic disease prevention. These documents, all currently or soon available through the Ministry's web site, address the cost of obesity, the cost of physical inactivity, current eating habits, core functions in public health, and evidence regarding the causation and prevention of chronic disease. In addition, we are currently developing a directional document focusing on physical activity, healthy eating, and healthy body weight; and the Provincial Health Officer is developing reports on diabetes and food in the lives of British Columbians.*
- *Strategic Alliances*
  - *MOHS is fostering strong linkages with the BC Healthy Living Alliance (BCHLA), which was formed in February 2003 to encourage collaborative action to support primary prevention: physical activity, healthy eating, healthy body weight, and living smoke-free. BCHLA has a unique, cross-sectoral membership, including the Canadian Diabetes Association, the BC Recreation and Parks Association, the Union of BC Municipalities, the BC Lung Association, the BC College of Physicians and Surgeons, the Canadian Cancer Society (BC and Yukon Division), Dietitians of*

Canada, the Heart and Stroke Foundation of BC and Yukon, the Public Health Association of BC, the Provincial Health Services Authority, and the Interior health Authority. The formation of this group is a significant achievement, consistent with best practice. By working with this collective we have the capacity to reach millions of British Columbians with common messages that encourage healthy choices.

- *MOHS is also working with diverse partners to plan a broad-based stakeholder forum on the prevention and treatment of childhood obesity in BC. This forum is planned for Spring 2005.*

- *Inter-Ministerial Linkages — To take advantage of the enthusiasm associated with British Columbia hosting the 2010 Winter Olympic and Paralympic Games, MOHS is exploring and developing opportunities to collaborate across government on prevention and wellness initiatives related to physical activity and healthy eating. MOHS is strengthening working relationships with the Ministries of Agriculture, Food and Fisheries; Education; Small Business and Economic Development; Children and Family Development; and Community, Aboriginal and Women's Services.*

- *Targeted Prevention Initiatives — Action Schools! BC aims to make elementary school children more physically active, with the ultimate goal of promoting healthy hearts, healthy bones, healthy weight, and positive self-esteem. In 2004/05, Action Schools! BC will be implemented in 10 percent of BC's elementary schools, with a goal of 40 percent of schools involved in the following year and 70 percent in the third year. Action Schools! BC envisions long-term, measurable, and sustainable health benefits. Preliminary data indicates very positive results. Although the Auditor General's report touches on this initiative, it does not fully capture the scope or promise of this program.*

Management of Diabetes and Other Chronic Diseases

BC is leading the country in redesigning its health system to better care for people with diabetes and other chronic diseases. The Auditor General's Report mentions a few of the many important components of this initiative that have continued to develop rapidly over the past several months since the audit was completed.

The Chronic Disease Management initiative aims to achieve permanent, province-wide improvements in our system of care. It is based on the Chronic Care Model, a framework for system-wide improvement developed in the U.S. and acknowledged by the Auditor General to be "well-accepted and research-supported."

In our chronic care redesign initiatives, as in prevention, we are fulfilling our role as steward of the health system rather than provider of services. We are facilitating and coordinating the efforts of many front-line partners, such as health authorities and physicians, rather than attempting to devise and deliver centralized programs by ourselves. The current chronic care initiatives, like those related to prevention, are not confined to diabetes or any other single chronic disease. Similar processes (all based on the Expanded Chronic Care Model) are being employed simultaneously to improve the care of persons with a variety of chronic diseases, including diabetes, congestive heart failure, chronic kidney disease, and hypertension.

Recent diabetes-related achievements include:

System Level

- *development of a diabetes patient register based on administrative data allowing for the reliable identification of patients with diabetes and the ability to monitor health outcomes and health system performance; and*
- *inclusion of performance measures related to diabetes in the MOHS Service Plan.*

Caregiver Level

- *development and updating of a clinical practice guideline for diabetes*
  - *gives physicians ready access to evidence-based best practice information,*
  - *the diabetes collaborative (discussed below) is currently testing an expanded guideline that addresses early identification and treatment of individuals at high risk of diabetes; once finalized, this expanded guideline is expected to help prevent or delay the onset of the disease in many cases;*
- *support and encouragement for physicians to adopt best practices, e.g.:*
  - *a structured diabetes collaborative, led by the BC Medical Association, offering professional development and support for practice redesign,*
  - *the Full Service Family Practice Incentive Program, through which physicians are eligible to receive a bonus of $75 per year for each diabetes patient managed to best practice standards, as outlined in the clinical practice guideline,*
  - *development of flow charts and electronic tools to make the clinical practice guideline easy to use;*
- *development of a secure, on-line "toolkit" for physicians — enabling physicians to*
  - *easily identify their patients with diabetes,*
  - *measure their practice's compliance with the diabetes guideline,*
  - *implement an efficient patient reminder and recall system,*
  - *securely share information (including consult notes and referral letters) with other members of their practice network;*
- *provision, through federally funded primary health care renewal initiatives, of other significant information technology support for family physicians, including support for electronic medical records in physician offices and integration of physician office systems with those of health authorities; and*
- *negotiation of the 2004 Working Agreement with the BC Medical Association, which strengthens the collaborative approach of government and physicians in implementing primary care renewal in general and the Chronic Disease Management initiative in particular.*

Patient Level

- *development of resources to empower people to avoid/delay diabetes and other chronic diseases, and training to help patients become experts in managing chronic conditions. This includes:*
  - *The MOHS Chronic Disease Management web site – This site contains patient information and links related to diabetes (and other chronic diseases).*
  - *The BC HealthGuide Program – This innovative self-care/tele-care program offers information and advice to support prevention and management of diabetes and other chronic diseases to the public throughout BC. It includes a handbook, a medically approved web site, and a state-of-the-art telenursing line providing 24/7 advice from specially trained nurses and pharmacists.*
  - *Dial-A-Dietitian – This is a nutrition information line staffed by registered dieticians, who provide information and advice to the public on healthy eating, food safety, and other food and nutrition issues. People newly diagnosed with diabetes can get a brief consultation by phone prior to in-depth counselling through their health authority.*
  - *Courses and Coaching – This includes the evidence-based Chronic Disease Self Management Program, which helps people develop the skills they need to better look after their own health and cope with chronic conditions. It also includes a program aimed at helping physicians coach patients in how to manage chronic conditions.*

Conclusions and Next Steps

We acknowledge and agree with the Auditor General's recommendation for an organized process to search out and implement evidence-based interventions. In our view, such a process exists already for both chronic disease prevention and chronic disease care, and is beginning to produce excellent results. Indeed, the Auditor General's report cites the Chronic Care Model — the basis for our Chronic Disease Management initiative — as precisely the sort of approach we should be taking.

We have noted the report's comments concerning legislative approaches to prevention. The development of a new Public Health Act was initiated in 2002, and legislation is expected to be tabled in the Spring of 2006. As part of this process, we will examine whether legislation can assist with chronic disease prevention and health promotion.

In conclusion, MOHS appreciates the observations and recommendations contained in the Auditor General's timely report. As noted earlier, the best use for this report would be to help raise public awareness of diabetes and the social and health care changes needed to address it.

Response from the Provincial Health Authorities

August 20, 2004

Auditor General of British Columbia
#8 Bastion Square
Victoria, BC V8V 1X4

Attention: Morris Sydor, Senior Principal

Dear Mr. Sydor:

Re: Preventing and Managing Diabetes in British Columbia

This letter is a follow-up to the July 27, 2004 letter from Wayne Strelioff to Wynne Powell regarding a joint response by the Health Authorities to the Auditor General's Diabetes Report.

This letter constitutes feedback from the following Health Authorities: Provincial Health Services, Fraser, Vancouver Island, Vancouver Coastal, Northern and Interior. The response has been divided into two sections; the first section deals with overall comments on the report from the Health Authority perspective, and the second section is a list of specific comments on parts of the report (appended to this letter).

The report on diabetes is a timely one as the burden of this disease to patients and their families is growing at an alarming rate. Without a coordinated approach to this issue from prevention through treatment, the burden on individuals and the healthcare system as a whole will add significantly to the stress on the health system.

There was a strong consensus that the report is a fair and reasonable report which reflects the current state of the management of diabetes within the province. The report is accurate in reflecting that there currently is no comprehensive multi-faceted province-wide program for diabetes care and prevention. Hopefully this report is an excellent first step in addressing the burden of diabetes, not only within the healthcare setting but our population as a whole.

Several Health Authorities commented that while diabetes may be the subject of the audit, the approaches used to prevent and manage diabetes are consistent with those needed for other chronic diseases. It would be a mistake to miss the opportunity to develop comprehensive province-wide approaches to a complete set of chronic diseases rather than just diabetes, although diabetes is one of the most urgent and pressing with a recognized economic impact on the province. It would make sense to utilize a province-wide approach to diabetes prevention and care strategy as a template for approaches to other chronic diseases.

The report also highlighted a comprehensive approach to prevention. It was noted that using the WHO definitions of primary and secondary prevention, and an appropriate definition of tertiary prevention, are important within the context of healthcare, as well as other sectors.

Response from the Provincial Health Authorities

A major focus of commentary from the Health Authorities was the need for an all-inclusive approach to the issue of diabetes across the entire public sector including the Federal Government, private sector and non-governmental sector. If we are to make significant advances in the prevention of diabetes, a multisectoral approach must be taken. Examples used by Health Authorities were the importance of the agricultural (primary and secondary processing) sector, dietary choices and the role that the school system plays in promoting healthy living. The provincial government is the only body that can take the lead in working with all groups on issues key to preventing diabetes, including healthy weight, healthy diet and adequate levels of physical activity. Without this leadership and cooperation of all sectors there can be no comprehensive solution to the diabetes issue.

Another important point is with the incidence of diabetes being four times higher in First Nations communities, there is a strong need for provincial and federal collaboration on this issue. Approaches that the province takes should be in concert with the First Nations and Inuit Health Branch and Health Canada or we will not have a comprehensive strategic approach to the issue.

The Health Authorities feel strongly that the information technology issues identified in the report must be addressed in order to increase our ability to deal with diabetes. The Health Authorities must continue, and be supported in, their technology investments in integrated information systems including the electronic health record designed to achieve better patient outcomes. As the report indicates, an integrated information system will achieve better results without increasing overall cost, but it does require significant capital investments. This investment must extend beyond the Health Authorities to the individual family physicians who, as the report points out, are a cornerstone of the chronic disease management model. While all Health Authorities are currently laying the foundation for this, there is no solution available at the present time to adequately address this issue.

What this really speaks to is the need for the electronic health record, which would offer information specific to diabetes. The Ministry of Health has been active in developing an electronic medical summary which can be available to physicians throughout the province. These efforts, as well as the work done by the Health Authorities, must continue and be supported. However, significant capital investment and cooperation will significantly advance the development of comprehensive chronic disease management information systems to support diabetes initiatives.

In conclusion, to quote one of the Health Authorities "This report will hopefully be used to highlight the need for coordinated approaches to all chronic disease management. If it furthers the dialogue and cooperation between all of the players, federally, provincially, regionally and locally, to commit the resources necessary to develop and implement a comprehensive strategy, it will have been a useful exercise".

Should you have any questions regarding this letter please do not hesitate to contact me.

Yours truly,

Lynda Cranston
President and Chief Executive Officer

COMMENTS FROM HEALTH AUTHORITIES

- *Although the focus on primary prevention is directed to the provincial government, there needs to be a greater acknowledgement that addressing the problem goes way beyond governmental institutions and includes NGO's, communities, families and individuals. The changing of risk behaviours and the changing of societal values and norms is complex and involves many players.*

- *Page 3 – it is noteworthy that the audit criteria provided no focus on expectations for the prevention of the diabetes, yet the auditors have come to the important conclusion that primary and secondary prevention are key elements in diabetes. This predisposing bias which is prevalent in the health system is one of the challenges in shifting the culture to one of preventing disease and its complications from that of merely managing an identified illness.*

- *Page 4: the logic on page 4 is questionable. The prevention of diabetes will require a significant resource allocation and commitment, however as is the case of tobacco reduction, is in the long term a cost-saving albeit that it requires resource investments initially to stimulate the transformation that is necessary.*

- *Page 5: We would encourage the recommendations to be inclusive of specific time frames. Also, there are a variety of existing best practices that should be applied within the BC context and the continuation of haphazard pilot programming remains highly questionable when preventative activities (primary, secondary and tertiary) should be identified as a core program based on best practices.*

- *Page 9: It is appreciated that the authors do not have a health background and have done a remarkable job addressing clinical issues, but would encourage that the report be carefully reviewed by a diabetologist for factual accuracy. For example, the excretion of water is due to the increased osmolarity within urine caused by glucose, and not as an effort to dilute the urine. While the impact of the audit may be predominately in the policy field for which such subtleties are of little consequence, its credibility to practitioners must be solid.*

- *Page 14 – we are of the belief that while many studies are based on self-reporting that these studies are at least consistent with measurement studies and self-report is considered sufficiently valid to be used. One has to recall that most tobacco studies are also based on self-report and this is not considered a major concern, however validation studies do show some underreporting.*

- *Page 28: The statement that primary prevention has had only a few large-scale successes is inappropriate. In fact, the majority of health gains made in the later half of the 20th century were through primary prevention. The audit report provides some well acknowledged examples of the use of some of the public education efforts which have been effective, and even these are often a combination of "public" education with policy modification. Its not surprising that preventative efforts remain unsupported when such a narrow and inappropriate view of the effectiveness of prevention activities. The auditors are encouraged to review mortality and morbidity statistics on motor vehicle collisions and other injuries, cardiovascular disease, communicable diseases, certain cancers, amongst others. The primary prevention efforts which have been undertaken in these areas are well documented but perhaps not well appreciated.*

- *Page 29: The section emphasizing the need for a multilevel multi-strategic approach to addressing lifestyle issues deserves commendation. Far too often efforts fail from the insufficient dose, insufficient time problems.*

- *Page 30: It may be helpful for the auditors to define what is sometimes referred to as the "preventative dose" – it is alluded to, but keeping with common terminology for the profession would be beneficial.*
- *Pages 38–40: successful screening programs require more than just the three elements. The three elements assume an individual view of screening and not a population view. Just as important is the identification of the persons at risk at ensuring that this population is screened. In addition, a population based screening program needs to ensure that positively screened persons complete follow-up and engage in a treatment regime. Screened and confirmed persons should form the basis of a registry for chronic disease management programs.*
- *Page 50: Correctly speaking there are several chronic disease centers developing in the Interior. There is one program which was not identified to the auditors as it is provided outside the context of regional Health Authorities but is clearly a best practice. Valley Medical Laboratories in the Central Okanagan have developed a registry of clients with diabetes based on laboratory based criteria and are striving to ensure that these clients are appropriately tested. This initiative undertaken by a private health care provider serves several thousand diabetics in the Central Okanagan and has branched into the direct provision of patient results to a selected group of physician's patients. While the program has not yet measured impact, it is clearly an example of the sort of innovative and population based approach that will be essential for the successful management of diabetics.*
- *Page 52–54: It is perhaps the dilemma facing the health system. Diabetes education centres have developed and flourished as a convenient method of providing service delivery, however it is unclear how this method of service delivery compares with other methods of providing support to diabetics. Of concern is the issue of whether we need disease specific centres for all varieties of chronic diseases and in particular how diabetes education centres interact when clients suffer from more than one chronic illness, which is a common scenario.*
- *Page 55: While it is acknowledged that there are a few Type II childhood diabetics, the audit was to focus its attention on the Type II diabetics, the comments on Type I diabetics on page 46 need to clearly stipulate that management of Type I diabetics includes several discontinuities, which is a function of the policy decisions which have been made to date on the allocation of responsibilities for children's health.*
- *Page 60: In the third paragraph there is a statement referencing prevention interventions. This statement is even more applicable to all interventions and not just prevention interventions. In fact, there are few therapeutic interventions which don't cost considerable resource compared to not doing anything (which while an unethical standard of care is the comparable unit for the current state of failing to provide prevention interventions). What is the most important unit of comparison is the cost-effectiveness measures of prevention activities compared with management of identified cases only. The need to make this comparison as a critical decision point appears to be alluded to but is not explicitly stated and needs to be.*
- *The report is accurate in pointing out that there is no comprehensive, multi-faceted province wide program for Diabetes care and prevention. There needs to be a caution to avoid a compartmentalized approach to chronic disease management. The approaches used to prevent and manage diabetes are consistent with those needed for other chronic diseases. It would be a mistake to miss the opportunity to develop comprehensive province wide approaches to a set of chronic diseases rather than just diabetes, although diabetes is one of the most urgent*

and pressing with a recognized economic impact on the province. Diabetes prevention and care strategies could be an excellent template for approaches to other disease entities. However, the strategies employed shouldn't preclude health care providers from using the same approaches and resources in the care of other chronic diseases. The current CDM Collaboratives are a good example of an integrated approach to disease management.

- *Primary Prevention: We agree with the Auditor General's comments on advertising campaigns (p. 32). These campaigns work best when they are targeted and part of a comprehensive strategy. We wouldn't recommend abandoning advertising campaigns. Rather, they should be incorporated into an overall approach to primary prevention.*
- *In order to be effective in Primary Prevention, resources need to be comprehensive and sustained over time (p. 30). This is stated in the text of the last paragraph but needs emphasis. It is very challenging to make a difference on one time, pilot project funding. Our experience is that we get pilot projects with the intention of generalizing what is learned during the pilot to other realms of activity. However the resources rarely follow to actually accomplish that spread.*
- *We agree that successful primary prevention will require concerted effort by the provincial government (p. 32) but again this would best be part of a comprehensive strategy that included the kind of policy level decisions described in the report in coordination with more local and regional based action and policy work. It is when multiple levels are collaborating and moving forward in the same direction that change occurs. The example of tobacco action and reduction strategies is appropriate.*
- *Secondary Prevention: Many diabetes education programs and heart health programs are working towards risk reduction similar to the program in Prince George, which is highlighted. However, this is not necessarily a purposeful, planned approach. It has happened more by default as practitioners have identified the need and opportunity.*
- *We agree that a more planned approach is needed. This would likely need some resourcing. This could be an added component to the Diabetes and Community Collaborative processes already underway and further supported in the latest Working Agreement between the BCMA and the Ministry of Health. These collaboratives encouraging physician teams to begin identifying people at risk as well as those who are diagnosed with Diabetes.*
- *This report will hopefully be used to highlight the need for coordinated approaches to all chronic disease management. If it furthers dialogue and cooperation between all of the players, federally, provincially, regionally and locally, to commit the resources necessary to develop and implement a comprehensive strategy, it will have been a useful exercise.*

Appendices

Appendix A: Office of the Auditor General: Risk Auditing Objectives and Methodology

The Office has three lines of business:

- Attesting to the reliability of government financial statements;
- Assessing the quality of government service plan reports;
- Examining how government manages its key risks.

Each of these lines of business have certain objectives that are expected to be achieved, and each employs a particular methodology to reach those objectives. The following is a brief outline of the objectives and methodology applied by the Office for assessing the management of risk within government programs and services, that is, risk auditing.

Risk Auditing

What are Risk Audits?

Risk audits (also known as performance or value-for-money audits) examine whether money is being spent wisely by government—whether value is received for the money spent. Specifically, they look at the organizational and program elements of government performance, whether government is achieving something that needs doing at a reasonable cost, and consider whether government managers are:

- making the best use of public funds; and
- adequately accounting for the prudent and effective management of the resources entrusted to them.

The aim of these audits is to provide the Legislature with independent assessments about whether government programs are implemented and administered economically, efficiently and effectively, and whether Members of the Legislative Assembly and the public are being provided with fair, reliable accountability information with respect to organizational and program performance.

In completing these audits, we collect and analyze information about how resources are managed; that is, how they are acquired and how they are used. We also assess whether legislators and the public have been given an adequate explanation of what has been accomplished with the resources provided to government managers.

Appendix A: Office of the Auditor General: Risk Auditing Objectives and Methodology

Focus of Our Work

A risk audit has been described as:

> *...the independent, objective assessment of the fairness of management's representations on organizational and program performance, or the assessment of management performance, against criteria, reported to a governing body or others with similar responsibilities.*

This definition recognizes that there are two forms of reporting used in risk auditing. The first—referred to as attestation reporting—is the provision of audit opinions as to the fairness of management's publicly reported accountability information on matters of economy, efficiency and effectiveness. This approach has been used to a very limited degree in British Columbia because the organizations we audit do not yet provide comprehensive accountability reports on their organizational and program performance.

We believe that government reporting along with independent audit is the best way of meeting accountability responsibilities. Consequently, we have been encouraging the use of this model in the British Columbia public sector, and will apply it where comprehensive accountability information on performance is made available by management.

As the risk audits conducted in British Columbia use the second form of reporting—direct reporting—the description that follows explains that model.

Our "direct reporting" risk audits are not designed to question whether government policies are appropriate and effective (that is achieve their intended outcomes). Rather, as directed by the Auditor General Act, these audits assess whether the programs implemented to achieve government policies are being administered economically and efficiently. They also evaluate whether Members of the Legislative Assembly and the public are being provided with appropriate accountability information about government programs.

When undertaking risk audits, we look for information about results to determine whether government organizations and programs actually provide value for money. If they do not, or if we

are unable to assess results directly, we then examine management's processes to determine what problems exist or whether the processes are capable of ensuring that value is received for money spent.

Selecting Audits

All of government, including Crown corporations and other government organizations, are included in the universe we consider when selecting audits. We also may undertake reviews of provincial participation in organizations outside of government if they carry on significant government programs and receive substantial provincial funding.

When selecting the audit subjects we will examine, we base our decision on the significance and interest of an area or topic to our primary clients, the Members of the Legislative Assembly and the public. We consider both the significance and risk in our evaluation. We aim to provide fair, independent assessments of the quality of government administration and to identify opportunities to improve the performance of government. Therefore, we do not focus exclusively on areas of high risk or known problems.

We select for audit either programs or functions administered by a specific ministry or government organization, or cross-government programs or functions that apply to many government entities. A large number of such programs and functions exist throughout government. We examine the larger and more significant of these on a cyclical basis.

Our view is that, in the absence of comprehensive accountability information being made available by government, risk audits using the direct reporting approach should be undertaken on a five- to six- year cycle so that Members of the Legislative Assembly and the public receive assessments of all significant government operations over a reasonable time period. We strive to achieve this schedule, but it is affected by the availability of time and resources.

Planning and Conducting Audits

A risk audit comprises four phases—preliminary study, planning, conducting and reporting. The core values of the Office—independence, due care and public trust—are inherent in all aspects of the audit work.

Appendix A: Office of the Auditor General: Risk Auditing Objectives and Methodology

Preliminary Study

Before an audit starts, we undertake a preliminary study to identify issues and gather sufficient information to decide whether an audit is warranted.

At this time, we also determine the audit team. The audit team must be made up of individuals who have the knowledge and competence necessary to carry out the particular audit. In most cases, we use our own professionals, who have training and experience in a variety of fields. As well, we often supplement the knowledge and competence of our staff by engaging one or more consultants to be part of the audit team.

In examining a particular aspect of an organization to audit, auditors can look either at results, to assess whether value for money is actually achieved, or at management's processes, to determine whether those processes should ensure that value is received for money spent. Neither approach alone can answer all the questions of legislators and the public, particularly if problems are found during the audit. We therefore try to combine both approaches wherever we can. However, because acceptable results-oriented information and criteria are often not available, our risk audits frequently concentrate on management's processes for achieving value for money.

If a preliminary study does not lead to an audit, the results of the study may still be reported to the Legislature.

Planning

In the planning phase, the key tasks are to develop audit criteria—"standards of performance"—and an audit plan outlining how the audit team will obtain the information necessary to assess the organization's performance against the criteria. In establishing the criteria, we do not expect theoretical perfection from public sector managers; rather, we reflect what we believe to be the reasonable expectations of legislators and the public.

Conducting

The conducting phase of the audit involves gathering, analyzing and synthesizing information to assess the organization's performance against the audit criteria. We use a variety of techniques to obtain such information, including surveys, and questionnaires, interviews and document reviews.

Appendix A: Office of the Auditor General: Risk Auditing Objectives and Methodology

Reporting Audits

We discuss the draft report with the organization's representatives and consider their comments before the report is formally issued to the Legislative Assembly. In writing the audit report, we ensure that recommendations are significant, practical and specific, but not so specific as to infringe on management's responsibility for managing. The final report is tabled in the Legislative Assembly and referred to the Public Accounts Committee, where it serves as a basis for the Committee's deliberations.

Reports on risk audits are published throughout the year as they are completed, and tabled in the Legislature at the earliest opportunity. We report our audit findings in two parts: an Auditor General's Comments section and a more detailed report. The overall conclusion constitutes the Auditor General's independent assessment of how well the organization has met performance expectations. The more detailed report provides background information and a description of what we found. When appropriate, we also make recommendations as to how the issues identified may be remedied.

It takes time to implement the recommendations that arise from risk audits. Consequently, when management first responds to an audit report, it is often only able to indicate its intention to resolve the matters raised, rather than to describe exactly what it plans to do.

Without further information, however, legislators and the public would not be aware of the nature, extent, and results of management's remedial actions. Therefore, we publish updates of management's responses to the risk audits. In addition, when it is useful to do so, we will conduct follow-up audits. The results of these are also reported to the Legislature.

Appendix B:
Office of the Auditor General: 2004/05 Reports Issued to Date

Report 1

Follow-up of Performance Reports, April 2004

Report 2

In Sickness and in Health: Healthy Workplaces for British Columbia's Health Care Workers

Report 3

Preventing and Managing Diabetes in British Columbia

This report and others are available on our website at http://www.bcauditor.com

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